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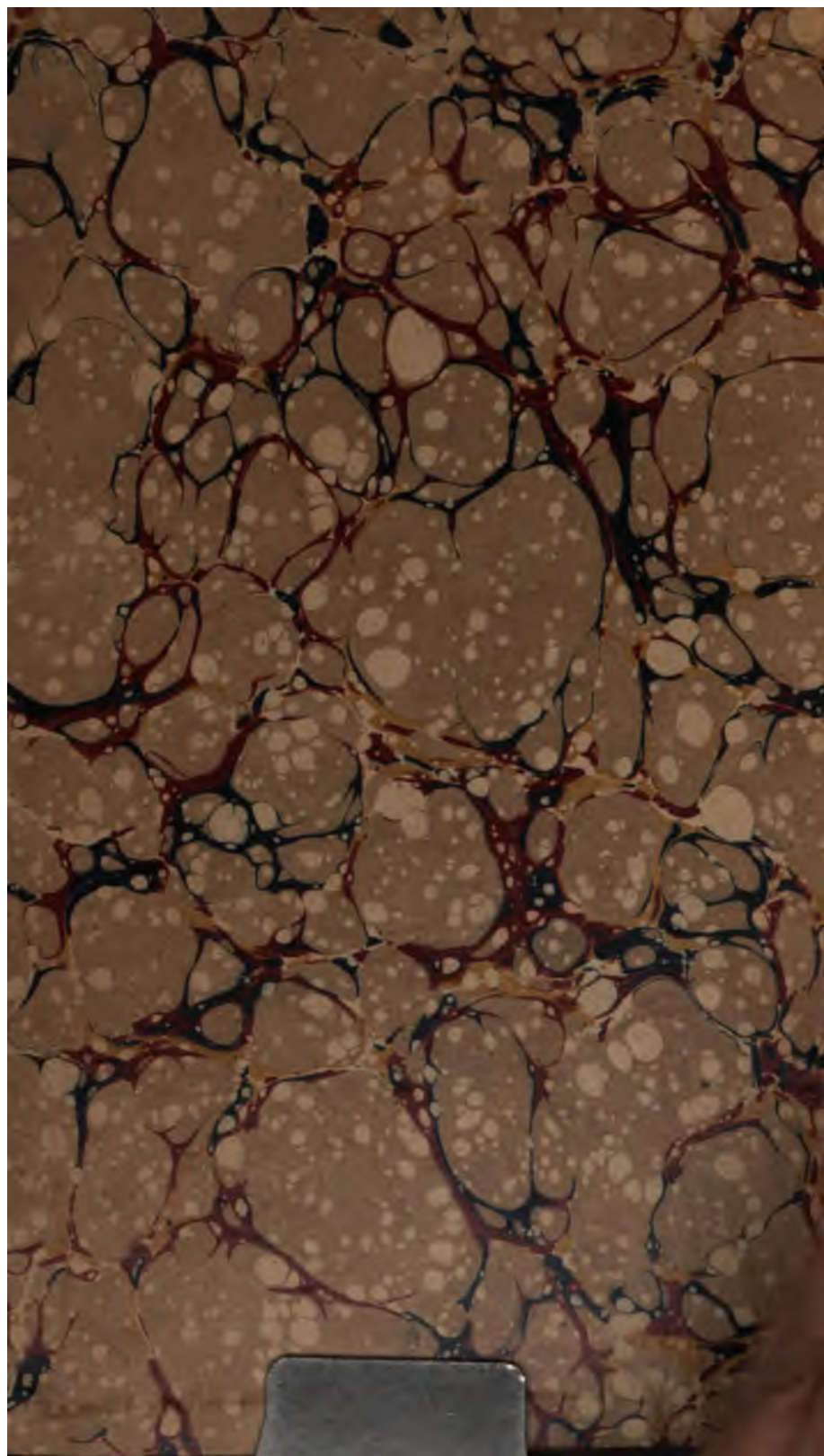
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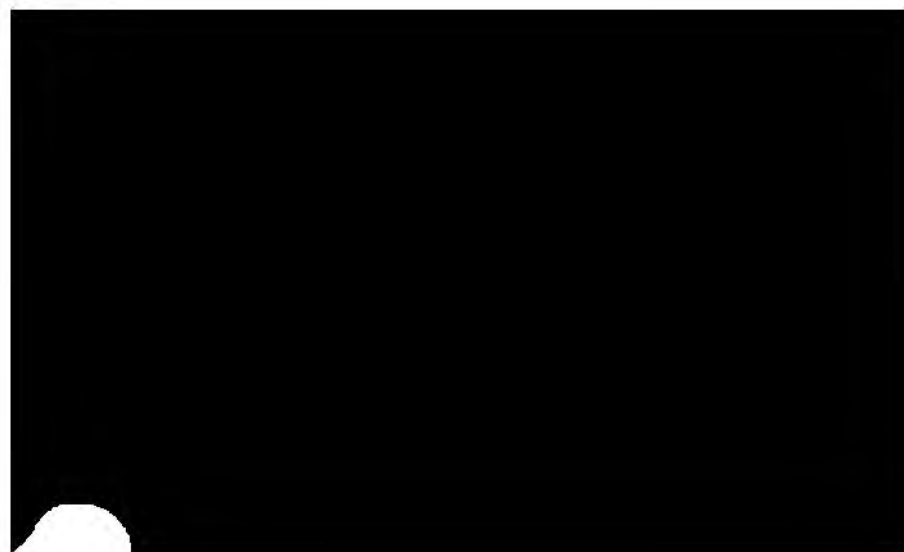
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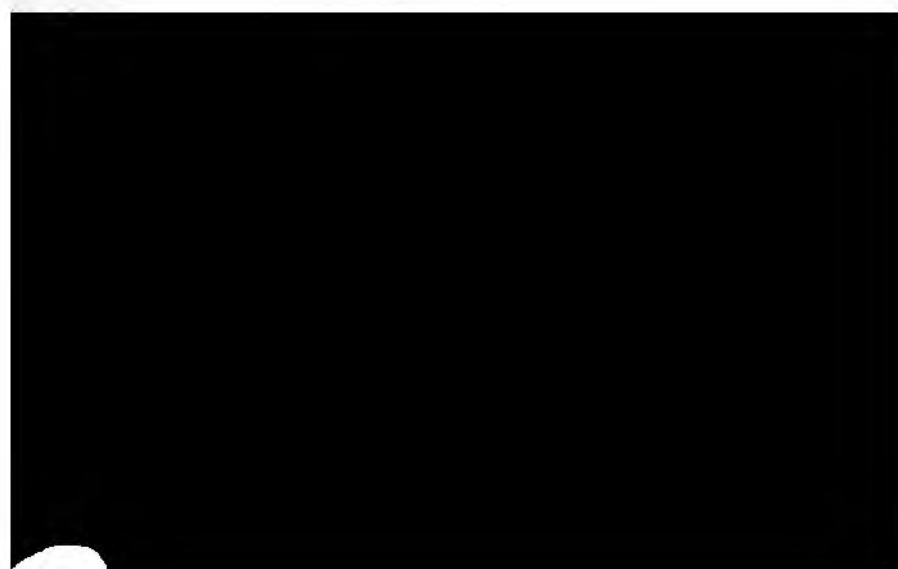
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VOL. I.
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A N N A L S
OF THE
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SEPTEMBER, 1823.

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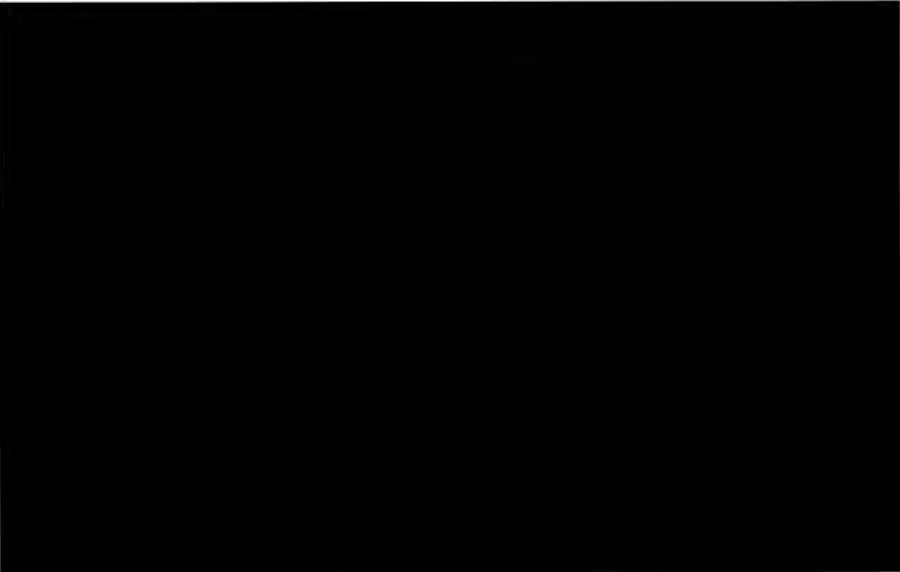
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THE object of the Lyceum, in publishing its Annals, is to record new and valuable facts in Natural History ; and to advance the public good by the diffusion of useful knowledge. The importance of this science is, at present, everywhere acknowledged ; and the attention bestowed on it, in our own country, has already been amply repaid. A great variety of new, useful, and elegant productions have been discovered ; and important facts, connected with the agricultural, commercial, and manufacturing interests, have been elucidated. In our attempts to bring to light the hidden riches of our country, we solicit the assistance of the public. We ask no emolument, we expect no gain. We cherish the hope that our exertions will be encouraged ;



SYNOPTICAL VIEW of the LICHENS growing in the vicinity of the City of New-York. By ABRAHAM HALSEY. Read before the Lyceum, June 16, 1823.

NOTWITHSTANDING the great progress which the science of botany has made in this country, the cryptogamic branch of it still suffers under the most unmerited neglect. Of the several tribes which compose this interesting department, the Ferns and Mosses have received some share of attention ; and the Fungi have lately been ably illustrated by Mr. De Schweinitz, in his valuable work on the Fungi of North Carolina ; but the Algæ and Lichens appear to have been but little regarded ; the Catalogue of Muhlenberg comprising such as were observed chiefly in his immediate neighbourhood, and the brief enumeration in the New-York Catalogue, being the only sources of information from whence the little we have on these subjects is derived. The difficulty with which the student of cryptogamy has to contend is greatly enhanced by the scarcity of books with enlarged descriptions and figures, and the rarity of well-authenticated specimens ; a very few of which are occasionally to be found in private collections. The Synopsis of Acharius is almost the only work on the Lichens to which access can be had in this place ; and the extreme difficulty of determining, with his definitions, our native species, diversified as they are by difference of soil and climate, is very apt to deter botanists from the study of Lichenology. We look, therefore, with eagerness to our own cryptogamists, who describe from indigenous specimens ; and in particular the long-promised work of Mr. De Schweinitz, would constitute an important era in the history of this science, in rendering the treasures of our cryptogamy as accessible as those of the elder and more favoured branch of botany.

In the mean time, under the persuasion that the smallest contribution will be acceptable, I offer, for the consideration

of the Lyceum, a catalogue of the Lichens, which I have collected in the neighbourhood of this city, and within a circuit of fifty miles; a few are added, of which specimens were received from correspondents in the northern part of this State and in Massachusetts. To supply, in some measure, the barrenness of a bare enumeration, I have added the leading characteristics of the different species; not with the hope, however, of having always succeeded in defining them with precision. The difficulty of seizing a single prominent feature, which shall be invariable in all cases, will be acknowledged by those who have studied this microscopic and polymorphous family. Specimens of a number of species, of which I could find no descriptions, were sent to Mr. De Schweinitz, the highest authority on this subject in this country, for his opinion; and I have retained the names which were returned by that gentleman: I should add, however, that for the imperfect descriptions attempted of them, I alone am responsible. I have only to express the hope, that this sketch may call the attention of our botanists to this interesting family of plants, so remarkable for their beauty and variety, and the important part they perform in the vegetable economy.

L. Class. IDIOTHALAMI.

1. Order. HOMOGENEL. Apothecia simple, wholly formed from a uniform pulverulent or cartilaginous substance.

† *Apothecia without a raised margin.*

1. SPILOMA.

1. *melaleucum*. Ach. Syn. p. 2. Common on rough bark of trees.

2. *roseum*. Nov. spec. nobis. Rare. On bark of Juglans.

S. crusta tenui, granulosa, rosea; apotheciis solitariis, punctiformibus, pulveraceis, saturate roseis. Fig. 1.

This pretty little Lichen, found on the rough bark of Hickory, for the present I refer to this genus, with which it appears to have greater affinity than with any other. It is readily dis-

tinguishable by its light lake or rose-coloured crust, which is very thin and rough. The apothecia are oval, minute, scattered, and of a deeper colour than the crust.

2. ARTHONIA.

1. *punctiformis*. Ach. p. 4. On smooth bark. Crust white; apothecia small, subimmersed.
2. *Swartziana*. Id. p. 5. On old trunks of trees. Crust white; apothecia broad and confluent.
3. *astroidea*. Id. p. 6. On smooth bark. Crust ashy and glaucous; apothecia flat, stellate, and shapeless.
4. *obscura*. Id. p. 6. Ibid. Crust olivaceous; apothecia small, oval, uniform, subimmersed.

†† *Apothecia with a raised margin.*

3. LECIDEA.

§ *Fronde crustaceous, uniform.*

* *Apothecia constantly black.*

1. *atro alba*. Id. p. 11. Common on rocks. Areolæ of the crust black and white.
2. *fumosa*. Id. p. 12. Ibid. Crust dull smoky colour; apothecia sunk into the crust, grayish within.
3. *pantosticta*. Id. p. 13. Ibid. Apothecia minute; immersed in the crust upon the areolæ.
4. *lapicida*. Id. p. 13. Ibid. Apothecia mostly between the areolæ.
5. *petraea*. Id. p. 15. Ibid. Distinguishable by the concentric tendency of the apothecia.
6. *confluens*. Id. p. 16. Ibid. To the naked eye like No. 1 and 4; crust dirty white; apothecia irregular and aggregated.
7. *premnea*. Id. p. 17. Trees and fences. Apothecia with a whitish stratum under the disk.
8. *parasema*. Id. p. 17. Bark. Crust generally bordered by a black line; apothecia blackish within.
9. *enteroleuca*. Id. p. 19. Trunks. Apothecia internally white.

10. *dolosa*. Ach. Syn. p. 19. Trunks and fences. Crust pulverulent; rusty gray; apothecia convex.
11. *sanguinaria*. Id. p. 19. Ibid. Rare. Apothecia internally blood-red.
12. *sabuletorum* β . *geochroa*. Id. p. 20. Encrusting mosses in woods. Crust effuse, granulated, ashy.
13. *citrinella*? Id. p. 25. Old stone fences. Rare. Crust green; apothecia small, black.

** *Apothecia black; when moistened, brownish.*

14. *immersa*. Id. p. 27. Common on hard rocks. Apothecia sunk into the surface of the stone upon which the crust resides.

*** *Apothecia black, with a gray bloom.*

15. *albo cærulescens*. Id. p. 29. On rocks. Rare. Crust tartareous and cracked, whitish; apothecia flat.
16. *corticola*. Id. p. 32. Trunks and fences. Crust granulated, very white; apothecia small and subglobose.

**** *Apothecia with a fuscous or brownish colour.*

17. *versicolor*. Schwz. mss. Very common on smooth bark. Crust greenish, and bounded by a broad waving black line; apothecia small, greenish and other dark colours, clustered and stellate to the naked eye.
18. *luteola*. Ach. p. 41. Trunks and rocks. Crust thin, grayish, with globular pale granules; apothecia dirty yellow.
19. *carneola*. Ib. p. 42. Trunks. Crust thin, gray; apothecia sessile, thick, fleshy brown.

***** *Apothecia of various colours.*

20. *coccinea*. Schwz. mss. Common on trunks. Crust cinereous, and bordered by a black line; apothecia shining, convex, beautiful scarlet, whitish within.
21. *marmorea* β . *cupularis*. Ach. Syn. p. 46. On the earth in woods, among moss. Crust very thin, scarcely distinguishable; apothecia urceolate, flesh-coloured. A strongly marked, though minute species.

22. *Ehrhartiana*. Id. p. 47. Common on rocks. Crust cartilaginous, greenish yellow, rough, granulated; apothecia pale yellowish.
 var. β . *polytropa*. Ibid. Crust subtartareous, tessellated, pale; apothecia crowded.
23. *aurantiaca*. Id. p. 50. Trunks and rotten wood. Crust smooth, whitish; apothecia orange, convex, margin lighter.

§§ *Crust foliaceus*.

24. *demissa*. Id. p. 50. On earth on rocks. Crust warty, subimbricated, lobed at the margin; apothecia reddish, depressed.
25. *globifera*. Id. p. 51. In the clefts and depressions on the surface of rocks. Crust imbricated, lobes detached, round, whitish underneath; apothecia subglobose, dark red.

4. CALICIUM.

* *Apothecia sessile*.

1. *tigillare*. Id. p. 55. Common on fences and old posts. This beautiful Lichen in habit nearly resembles a *Leccidea*, and is remarkable from the frond's first appearing in small yellow spots, upon which the black apothecia are seated. The intervals between these afterwards fill up, and the whole crust becomes continuous.
2. *turbinatum*. Id. p. 59. On bark, and parasitic on *Parmeliæ*, &c. Crust whitish; apothecia turbinate.
3. *stigonellum*. Id. p. 56. Crust none; apothecia subglobose.

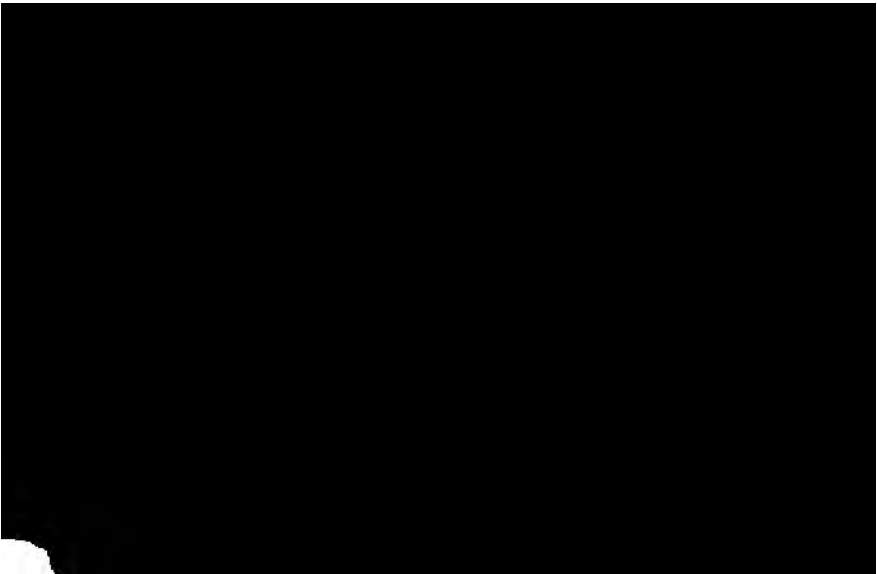
** *Apothecia stipitate*.

4. *clavicularæ*. Id. p. 57. Old fences and posts. Apothecia subglobose; pedicles cylindric, thick.
5. *trachelinum* β . *quercinum*. Id. p. 58. Ibid. Crust ashy or none; apothecia turbinate; pedicles filiform, short.

5. GREYOPHORA.

1. *prustulata*. Id. p. 66. On rocks. Rare. Frond underneath deeply pitted, smooth; apothecia rare, disk smooth.
2. *papulosa*. Id. p. 67. Ibid. Apothecia small, very numerous, and aggregated, urceolate and rarely gyrose.
3. *Pennsylvanica*. Id. p. 67. Frond subolivaceous, rough granular underneath; apothecia margined.
4. *Muhlenbergii*. Id. p. 67. Ibid. Frond wrinkled and scaly underneath; apothecia sunk in the pits.
5. *vellea*. Id. p. 67. Ibid. Rare in fruit. Frond large, coriaceous, sooty; apothecia generally towards the circumference of the frond.

6. OPEGRAPHA.

1. *macularis*. Id. p. 72. On smooth bark. Apothecia clustered and forming black spots.
 2. *herpetica* β . *disparata*. Id. p. 73. Ibid. Apothecia short, broad; crest of a reddish olive hue.
 3. *vulgata*. Id. p. 73. Trunks. Apothecia turgid, cylindric.
 4. *notha*. Id. p. 76. Ibid. Disk of the apothecia without the cleft.
var. β . gregaria. Ibid. Apothecia crowded; disk flex-
- 

var. β. pulverulenta. Smooth bark. Apothecia flexuous; disk gray pruinose.

γ. cerasi. On Beech. Crust shining; apothecia straight and parallel.

2. *betulina.* Id. p. 83. On Betula. Scarcely more than a variety of the last.

3. *serpentina.* Id. p. 83. Smooth bark. Crust very white; apothecia elongated, crowded, and waved.

†† *Apothecia without a margin.*

8. VERRUCARIA.

1. *punctiformis.* Id. p. 87. Old bark. Apothecia small, hemispheric, seldom papillated; nucleus subglobose.

2. *analepta.* Id. p. 87. Ibid. Apothecia conoid, papillated; nucleus compressed. Larger than the preceding.

3. *epidermidis.* Id. p. 89. Smooth bark of limbs. Apothecia very minute, flattened, roughish.

var. β. cerasi. On Betula. Crust shining, of a silvery hue.

4. *stigmatella.* Id. p. 89. Bark. Apothecia convex, not papillated.

var. β. lactea. Ibid. Crust milky white, sublucid.

5. *gemmata.* Id. p. 90. On bark. Apothecia shining, papillated.

6. *composita.* Schaez. mss. On Carpinus and Betula. Crust yellowish brown, very smooth, shining, and bordered by a black line; apothecia small, immersed, and clustering in long irregular dark spots. Fig. 4.

9. ENDOCARPON.

1. *amaragdulum.* Ach. p. 98. On rocks. Frond composed of very small, detached, scale-like lobes, of a light greenish or olive colour.

2. *tephroides β. polythecium.* Id. p. 99. On rocks. Frond adnate like a VERRUCARIA, cracked, of a light liver colour.

3. *Hedwigi.* Id. p. 99. On rocks. Fronds detached like No. 1, but larger.

4. *miniatum*. Id. p. 101. Common on rocks. Frond coriaceous and leafy, underneath of a reddish hue.
5. *complicatum*. Id. p. 102. Like the preceding, but of a dark colour underneath.
6. *Weberi*. Id. p. 102. On rocks near waterfalls. Like the two last, but the frond is of a thicker consistence, and changes to a greenish colour when moistened.

II. Class. CENOTHALAMI.

Order I. PHYMATOIDEI. *Apothecia included in wart-like processes formed from the frond.*

10. PORINA.

1. *pertusa*. Id. p. 109. Rocks and old trunks. Common. Apothecia with several orifices.
2. *leucostoma*. Id. p. 109. On trunks. Apothecia with white orifices; crust dark. Resembles a VARIOLARIA.
3. *lejoplaca*. Id. p. 109. Rocks and trunks. Apothecia with a single and irregular orifice.
4. *fallax*. Id. p. 110. Rough bark. Apothecia with an open expanded orifice, like a LECANORA.

11. THELOTREMA.

lepadinum? Id. p. 115. On bark. Very common. Probably a new species. Crust yellowish green.

12. PYRENULA.

1. *enteroleuca*. Sprengel MSS. *Thelotrema cinereum*. Schreb. Very common on trunks. Crust membranaceous, very white, sublucid, and to the microscope cracked and rugged. Apothecia above the crust, though surrounded by it at the base, cupuliform, open at the top like a LECIDEA; margin black, with a gray bloom; nucleus hemispheric, whitish with a black pruinose disk. Fig. 3. Specimens of this common Lichen were sent by Dr. Torrey to Professor Sprengel of Halle, and by him determined to be a new species of PYRENULA, under the name here adopted. It has much the habit of a LECT-

DEA, and possibly may be the *LECIDEA urceolata* of Acharius.

2. *nigrescens*. Ach. p. 126. Common on rocks. Crust tessellated, blackish; apothecia on the areolæ, black, shining, scarcely distinguishable to the naked eye.
3. *margacea*. Id. p. 127. Ibid. Crust ashy, rugged, and warty; apothecia globose, in appearance like a *PORINA* with several orifices.

13. VARIOLARIA.

1. *velata*. Id. p. 129. On bark. Crust white; disk of the apothecia covered with a white lamina.
2. *communis*. Id. p. 130. Ibid. Crust commonly darker than the apothecia.
3. *amara*. Id. p. 131. Ibid. Crust bitter to the taste.
4. *corallina*. Id. p. 133. Encrusting decayed mosses. Crust with coralline papillæ.

Order II. DISCOIDEI. *Apothecia scutelliform, subsessile; disk different from the margin, which is formed from the frond.*

14. URCEOLARIA.

1. *cinerea* β . *notata*. Id. p. 40. On hard rocks. Crust ashy, smooth, and cracked; apothecia black, pruinose, immersed in the areolæ.
2. *calcareæ*. Id. p. 143. On calcareous rocks. Crust very white; apothecia smaller than in the preceding.

15. LECANORA.

§ *Crust adnate, uniform.*

* *Apothecia with a black and naked disk.*

1. *atra*. Id. p. 146. On trunks and rotten wood. Crust very white; apothecia crowded, angular, margin flexuous.
var. γ . *calliginosa*. Ibid. Crust dark.
2. *commutata*. Id. p. 149. Fences and rotten wood. Crust thin, with greenish white dust; apothecia concave.
3. *periclea* β . *exigua*. Id. p. 151. Ibid. Crust dirty white, and blackish; apothecia small and crowded.

4. *sophodes*. Id. p. 153. Ibid. Crust verrucose, subdetermined, ashy greenish; apothecia crowded, black, brownish when moistened, margin tumid, very entire.

*** Apothecia with a brown coloured disk.*

5. *subfusca*. Id. p. 157. Bark. Crust smooth, cartilaginous, granulated; apothecia dark, margin thick.
6. *ventosa*. Id. p. 159. Bark and rocks. Crust tessellated with tumid warts, yellowish or gray; apothecia reddish, brown, convex.
7. *varia*. Id. p. 161. Common on old posts and fences. Crust light yellow; apothecia generally dirty green, yellowish, and brown.

**** Apothecia with a black or coloured disk,
always pruinose.*

8. *Villarsii?* Id. p. 163. On rocks. Crust tartareous, gyrose, granulated, whitish; apothecia black, sessile, disk concave.
9. *glaucoma*. Id. p. 165. Ibid. Crust grayish; apothecia black, immersed, disk at length convex, margin obliterated.
10. *angulosa*. Id. p. 166. On smooth bark. Crust smooth and subrimose; apothecia crowded and angular.
11. *cæcio rubella*. Id. p. 167. Trunks. Crust membranaceous and white; apothecia large, light red.
12. *albella*. Id. p. 168. Bark. Crust cartilaginous, smooth, milk white; apothecia light flesh-coloured.

****** Apothecia with disks of various colours.*

13. *perella*. Id. p. 169. On trunks. Crust thin, warty, white; apothecia light flesh-coloured.
14. *tartarea*. Id. p. 172. Rocks. Common. Crust white, tartareous, with clustered coral-like granules; apothecia light flesh-coloured. This is the *Cudbear* of the English, and used in dyeing purple on woollen.
15. *salicina*. Id. p. 175. Trunks. Crust granulated, dirty yellowish, hardly distinguishable; apothecia orange.

16. *fulva*. Schwz. mss. Common on rough bark. Crust papillated, verrucose, of a pale sulphur yellow; apothecia with an orange disk, when young immersed in the verrucæ of the crust, at length enlarging with a thin inflected margin. Fig. 2.

§§ Crust adnate, radiating, and lobed at the circumference.

17. *elegans*. Ach. p. 182. On rocks. (Massachusetts.) Crust orange, radiating lobes linear and convex.
18. *galactina*. Id. p. 187. Rotten trunks and rocks. Crust subimbricated, dirty white; apothecia crowded, angular, disk livid flesh-coloured, subpruinose.
19. *juglandina*. Schwz. mss. Common on smooth bark. Crust flat, orbicular, sublucid, olivaceous, towards the circumference light glaucous green, minutely laciniated through its whole surface, central segments scaly imbricated, marginal ones flat and broader towards the apex; apothecia central, small, disk fuscous, concave, margin very thick.

§§§ Crust foliaceous, scaly, imbricated.

20. *Smithii*. Ach. p. 189. Common on trunks. Crust scaly, lobes thick, roundish, waved, yellow orange, deepening in colour towards the apex; apothecia orange, like *PARMELIA rutilans*.
21. *irregularis*. Schwz. mss. Common on trunks. Crust scaly, lobes ascending, very minutely fringed, whitish gray, greenish when moistened; apothecia gray pruinose, dark brown when moistened, margin thick and entire.
22. *candelaria*. Ach. p. 192. On smooth bark. Crust scaly, bright yellow, margin of lobes granular; apothecia bright yellow.
23. *brunnea*. Id. p. 193. Trunks. Crust imbricated, ashy liver colour; apothecia reddish brown, margin crenulated.

16. PARMELIA.

§ *Fronde with segments of equal thickness at the apex.*

1. *placododia*. Id. p. 196. Trunks, stones, &c. Frond livid pale, underneath smooth and whitish, with black fibres.
2. *crinita*. Id. p. 196. Ibid. Frond grayish green, bearing branching coralline papillæ, underneath smooth, black, margin ciliated.
3. *caperata*. Id. p. 196. Ibid. Frond pale greenish yellow, underneath black hispid.
4. *Borreri*. Id. p. 197. Bark and on mosses. Frond gray, with whitish soredia; apothecia with a crenate, sublobed margin.
5. *scortea*. Id. p. 197. On trunks. Frond subcoriaceous, whitish gray, black dotted, sublucid.
6. *perlata*. Id. p. 197. Ibid. and stones. Frond grayish green, villose underneath.
7. *perforata*. Id. p. 198. Bark, and stones. Disk of the apothecia perforated.
8. *herbacea*. Id. p. 198. Trunks, and on the earth. Frond smooth, coriaceous, suborbicular; apothecia small, central. Has been removed to *STICTA* by Acharius.
9. *tiliacea*. Id. p. 199. Trunks. Frond grayish green, subpruinose, not dotted as in No. 5.
10. *olivacea*. Id. p. 200. Trunks and rotten wood. Frond dark olive, shining.
11. *plumbea*. Id. p. 202. Earth on mosses. Frond dark lead, and blackish when old.
12. *saxatilis*. Id. p. 203. Rocks and trunks. Segments generally reticulately lacunose on the upper surface, truncated at the apex.
13. *aleurites*. Id. p. 208. Bark. Frond generally covered with granular dust, much lacinated at the margin; apothecia light, margin crenulated.
14. *centrifuga*. Id. p. 209. Ibid. Frond greenish, divided through its whole surface into radiating segments.
15. *conspersa*. Id. p. 209. Ibid. Frond greenish, dotted black.

16. *rutilans*. Id. p. 210. Ibid. Frond deep yellow, whitish underneath; apothecia orange.
17. *venusta*. Id. p. 214. Bark, and among mosses. Frond deeply laciniated, segments narrow; margin of the apothecia leafy.
18. *stellaris*. Id. p. 216. Trunks. Frond stellate, segments convex, with whitish fibres beneath; apothecia black, pruinose.
19. *cæsia*. Id. p. 216. Trunks and rocks. Segments narrow, and more distant than the last.
var. ß dubia. Rocks. A very minute variety, resembling frost work.
20. *cycloselis*. Id. p. 216. Trunks. Frond stellate; segments short, broad, subconnate; apothecia blackish.
21. *ulothris*. Id. p. 217. Ibid. Like the preceding; apothecia, externally at the base, covered with black bristles.
§§ Frond with segments thickened at the apex.
22. *physodes*. Id. p. 218. Rocks, trunks, and on earth. Frond naked and shining beneath.
23. *colpodes*. Id. p. 219. Ibid. Frond spongy, and ragged beneath.

17. BORRERA.

1. *tenella*. Id. p. 221. Bark and on the earth. Like a *PARMELIA*. Frond white; segments narrow, pinnatifid, convex and ciliated at the apex.
2. *furfuracea*. Id. p. 222. Bark. Much like *EVERNIA prunastri*. Segments of the frond channeled beneath, and bluish black.
3. *chrysophthalma*. Id. p. 223. Very common on trunks. Frond yellow, with orange apothecia.
4. *exilis*? Id. p. 225. Ibid. Frond minute, white, segments attenuated and capillary. Perhaps only a variety of the preceding.

18. CETRARIA.

1. *ciliaris*. Id. p. 227. Fences and stones. Frond with segments fringed, and ciliated with strong rigid fibres.

2. *lacunosa*. Id. p. 227. Earth in moist woods. Frond more deeply pitted and reticulated than the last, segments not so much divided, whitish underneath; apothecia large.
3. *glauca*. Id. p. 227. Stones and fences. Frond glaucous, tawny, brown underneath.
4. *viridis*. *Schnoz. mss.* Small limbs in cedar swamps, New-Jersey. Frond glaucous green, lacunose reticulated, underneath pale yellow, margin complicatedly waved and beset with black soredia; apothecia chesnut brown, margin inflected, lobed, and dentated.

19. STICTA.

1. *crocata*. *Ach.* p. 232. Trunks and earth. (Massachusetts.) Frond of a livid colour, margin bordered with yellow.
2. *anthraspis*. Id. p. 233. Among mosses on earth. Frond smooth coriaceous, lobes roundish; apothecia with a blackish disk.
3. *pulmonacea*. Id. p. 233. About roots of trees. Much reticulated and sinuated.
4. *scrobiculata*. Id. p. 234. Ibid. Frond orbicular, light greenish, surface roughened by minute soredia.
5. *sylvatica*. Id. p. 236. On the earth with mosses. Frond with large segments, concave.

20. PELTIDEA.

1. *venosa*. Id. p. 237. Earth in woods. Frond with ashy-brown tomentose veins beneath.
2. *scutata*. Id. p. 237. Trunks and limbs. Smooth and veinless beneath, segments short.
3. *horizontalis*. Id. p. 238. Ibid. and on earth. Lobes elongated; shields flat and transversely oblong.
4. *aphthosa*. Id. p. 238. Earth on mosses. Frond light greenish, with small brown warts.
5. *canina*. Id. p. 239. Ibid. Lobes ascending, colour deeper than in the preceding.

21. NEPHROMA.

1. *resupinata*. Id. p. 241. Earth among moss. Frond brownish; distinguished by the apothecia being seated on the under side of the frond, the lobes of which turn over.

var. *β. papyracea*. Ibid. Frond greenish.

22. EVERNIA.

1. *prunastri*. Id. p. 245. Branches of trees. Rare. Frond granulated glaucous above, underneath whitish, reticulated.
2. *vulpina*? Id. p. 245. Massachusetts. Frond yellowish green, branching, segments attenuated, lacunose, compressed. In appearance like *CENOMYCE uncialis*, but easily distinguished by its central cotton-like medulla. Perhaps a new species.

Order III. CEPHALOIDEI. *Apothecia subglobose, terminating the frond.*

23. CENOMYCE.

§ *Frond foliaceous, podetia fistulous, attenuated, or dilated above.*

* *Apothecia pale.*

1. *cæspiticia*. Id. p. 249. On earth. Frond minutely cleft; podetia very short, marginal.
2. *alcicornis*. Id. p. 250. On earth, in dry rocky situations. Frond with pale greenish, palmated, ascending segments, lighter underneath; podetia hardly perceptible.
3. *endiviæfolia*. Id. p. 250. Ibid. Frond large, leafy, yellowish green, white beneath, segments multifid; podetia also very minute.
4. *verticillata*. Id. p. 251. On earth among moss. Podetia cylindric, glabrous, livid greenish, the margin dilating horizontally, proliferous from the centre.
5. *pyxidata*. Id. p. 252. Ibid. Podetia turbinate.

6. *fimbriata*. Id. p. 254. Ibid. Podetia elongate, turbinate, cups proliferous from the margin.

7. *gonorega* var. *pleolepis*. Id. p. 259. Podetia cylindric, open, scaly, and leafy.

** *Apothecia scarlet, or dark red.*

8. *bacillaris*. Id. p. 266. On rotten wood, fences, &c. Podetia cylindric, granulated, rarely cupbearing.

var. *δ. clavata*. Id. p. 267. Podetia thick, ventricose, and sterile.

9. *coccifera*. Id. p. 269. Fences, &c. Podetia elongate-turbinate, pale yellowish green, cups with spreading margins.

§§ *Fronde leafy, podetia subfistulous, cylindric, rayed at the apex; radii all fertile.*

10. *cariosa*. Id. p. 273. On earth. Podetia whitish, channeled, and verrucose, divided at the apex; apothecia crowded, dark.

11. *botrytes*. Id. p. 274. Rotten wood and earth. Podetia slender, fastigiately branching, rough; apothecia pel-tate, pale crowded.

§§§ *Fronde evanescent, podetia cartilaginous, straight, subulate, branching, axils perforated.*

12. *acicularis*. Id. p. 275. Rotten wood and earth. Podetia straight, terete; apothecia capitate, subglobose, solitary, shining, dark-coloured.

13. *furcata*. Id. p. 276. Ibid. Podetia smooth, livid, axils not perforated, branches acicular, forked and diverging at the apex; apothecia generally very small.

14. *uncialis*. Id. p. 276. Earth among moss. Podetia dichotomous, extremities of branches short and rigid.

15. *rangiferina*. Id. p. 277. Ibid. Podetia elongated, cylindric, branches scattered, and much divided, the ultimate ones subradiate or drooping; apothecia globose.
var. *β. sylvatica*. Podetia thick and turgid, branches short and sparse.

var. *γ. alpestris*. Podetia very branching, branches implex, terminal ones forming a thick panicle or thyrses.

24. BÆOMYCES.

1. *roseus*. Id. p. 280. On argillaceous earth. Pedicles white; apothecia pale rose.
2. *rufus*. Id. p. 280. On rocks. Crust rough, ashy-greenish; apothecia chesnut, pedicles short.

25. ISIDIUM.

1. *corallinum*. Id. p. 281. On rocks. Crust white, verrucose; apothecia only visible to the microscope.
2. *phymatodes*. Id. p. 282. Rotten wood in moist places. Crust green.

26. STEREOCAULON.

paschale. Id. p. 284. Frond grayish, branching, and rough with granular excrescences; apothecia terminal blackish.

(a)

III. Class. HOMOTHALAMI.

Order I SCUTELLATI. *Apothecia scutelliform, subsessile, bordered.*

27. ALECTORIA.

1. *jubata*. Id. p. 291. Pendent on branches chiefly of *Coniferae*. Frond black, capillary.

28. RAMALINA.

1. *polymorpha*. Id. p. 295. Trunks and rocks. Frond compressed, terete, with terminal soredia; apothecia submarginal.
2. *fraxinea*. Id. p. 296. Ibid. Frond broad, attenuated above; apothecia marginal, pale flesh colour.

(a) The genus *Rhizomorpha* has, by the best cryptogamists of the present day, been removed to the Fungi.

3. *fastigiata*. Id. p. 297. Trunks. Apothecia terminal.
Frond thickening and fastigate above.

29. COLLEMA.

§ *Frond leafy, lobes submembranaceous, loose, naked,
dark green.*

1. *nigrescens*. Id. p. 321. Trunks. Frond submonophyllous; apothecia central, reddish brown.
2. *furvum*. Id. p. 323. Ibid. Frond granulated on both sides; apothecia scattered.
§§ *Frond leafy, very thin, subdiaphanous;
apothecia subpedicellate.*
3. *tremelloides*. Id. p. 326. Earth on moss and on rocks. Frond lead-colour, dotted; apothecia scattered, of a reddish brown, margin pale.
4. *lacerum*. Id. p. 327. Trunks. Rare. Frond with small imbricated, laciniated, and fringed lobes.

Order II. PELTATI. *Apothecia peltate, without a border,
fringed.*

30. CORNICULARIA.

1. *pubescens*. Id. p. 302. On rocks and rotten wood near waterfalls. Rare. Frond short, blackish.
2. *fibrillosa*. Id. p. 302. (*sub var. pubescens.*) Common on fences. Certainly a distinct species.

31. USNEA.

1. *florida*. Id. p. 304. Common on trunks and rocks. Frond erect, rigid, greenish gray, with horizontal fibres; apothecia broad, with radiating ciliæ.
2. *plicata*. Id. p. 305. Branches of trees. Frond pendent, smooth, branches lax, much divided, and capillary.
var. β. hirta. Ibid. Frond erect, somewhat rigid, subpulverulent, and roughish, branches much divided, attenuated, and subfibrillose.

3. *barbata*. Id. p. 306. Ibid. Frond pendulous, smooth, terete, thick, branches diverging and fibrillose, articulated below the apex.
4. *angulata*. Id. p. 307. Ibid. Frond pendulous, quadrangular, angles sharp and scabrous. This species grows in Massachusetts to the length of four feet.†

IV. Class. ATHALAMI.

32. LEPRARIA.

1. *flava*. Id. p. 330. Old bark of trunks. Rare. Crust beautiful yellow.
 2. *latebrarum*. Id. p. 331. On the earth, and stones in shady moist places. Crust greenish gray, pulverulent.
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On the identity of the supposed PUMICE of the MISSOURI, and a variety of AMYGDALOID found near the ROCKY MOUNTAINS.
By EDWIN JAMES, M.D., Surgeon U. S. Army. Read before the Lyceum, April 14, 1823.†

THE light and porous stones, brought down the Missouri by the annual floods, and which have been spoken of as Pumice by Bradbury and others, differ from the ordinary varieties of Pumice, in being less easily if at all fusible by the blow-pipe; in the absence of the fibrous structure; and in many instances, of the semi-vitrified aspect of that mineral. From the accompanying specimens, it will be perceived, that the Pumice of the Missouri is, in all respects, similar to a substance collected about the beds of Amygdaloid in the Trap formation, near the sources of the Canadian river of the Arkansa. It occurs there in detached masses, of various dimensions, from which it would be easy to select specimens, exhibiting every intermediate stage of gradation in specific gravity and colour, from the

light, red, and porous masses, like those found floating on the Missouri, to the compact and dark-coloured greenstone, which is the prevailing rock in that formation.

It was suggested by Mr. Bradbury, and the opinion has been very generally adopted, that the origin of the supposed Pumice of the Missouri is to be ascribed to the agency of extensive subterranean fires, believed to exist in the coal-beds about the upper branches of that river; but it is well known that the long continued burning of many coal mines in places open to frequent examination, has not been found to give origin to substances of this sort. The obstinacy with which the mineral, in its present form, withstands the operation of heat, seems also to afford an argument unfavourable to this opinion.

Reports are frequent among hunters and travellers, who have visited the country about the Falls of the Missouri, the Yellow Stone, and the Eastern Ranges of the Rocky Mountains north of the Platte, which have been thought to justify the opinion that subterranean fires are now in existence in that quarter. We are told of natural chimneys, lined with soot, and which are sometimes seen to smoke, rising out of the summits of hills, about which are found large quantities of slag and cinder, like those of a blacksmith's furnace; and of other appearances confidently supposed to indicate the existence and the present activity of volcanic or pseudo-volcanic fires. Some have gone so far as to give a circumstantial description of a deep and wide chasm in the side of a mountain, called Coulter's Hill, out of which flames and smoke have often been seen to issue.

Those who have had frequent occasion to trace to their origin, popular traditions and the highly fanciful hypotheses of men little accustomed to the attentive examination of ordinary phenomena, will readily believe that the accounts above mentioned, may have had no other foundation than the occasional discovery about the upper branches of the Missouri, of some varieties of Amygdaloid, or some other black and porous

rock. It has been ascertained that the country along the base of the Rocky Mountains, a few degrees to the southward of the Missouri, contains extensive beds of Amygdaloid,* in connexion with which is found a substance similar in aspect and character to the mineral under consideration, and light enough to float on water, it will not perhaps be thought an extravagant conjecture to suppose that the reputed Pumice stone of the Missouri, is not a product of volcanic or pseudo-volcanic fires, at present in a state of activity; but a variety of Amygdaloid brought down by the rains and the currents of water, from an extensive formation of Trap rocks in that quarter.

Description of a new and gigantic species of the genus Cephalopterus, of Dumeril. BY S. L. MITCHILL, M.D. Read September 15, 1823.

CEPHALOPTERUS.

BODY much depressed, with five or six branchial openings on each side beneath, rostrum with two elongated fins, sustained by articulated rays. Tail long, slender, much narrower than the body.

SPECIES.—*C. Vampyrus, Oceanic Vampyre.* Breadth of the body exceeding its length; mouth nearly terminal, without teeth; a vertical fin on each side of the mouth projecting forwards; tail unarmed.—*Pl.* 2.

On the 9th day of September, 1823, a fish considerably different from any I had seen before, and unlike all the descriptions that I could find in the books, was brought to New York. It had been taken in the Atlantic ocean, near the entrance of Delaware bay, by the crew of a smack. They had

* For a particular description of the amygdaloid of this Trap formation, see the account of the Exploring Expedition commanded by Major Long, vol ii. p. 80.

heard that creatures of extraordinary form and size were frequent in the tract situated off Capes May and Henlopen, during the warm season; and accordingly equipped themselves for the purpose of catching one or more of them. After an absence of about three weeks, the adventurers returned with an animal of singular figure and large magnitude, which they had killed after a long and hazardous encounter. The weight was so considerable after it had been towed to the shore, that three pair of oxen aided by a horse and twenty-two men, could not drag it, by their united strength, to the dry land. By estimation, it was supposed to be somewhere between four and five tons.

	<i>feet.</i>	<i>inches.</i>
The length from the fore margin of the } head to the root of the tail, }	10	9
Length of the tail, }	4	0
Length of the fins projecting forward } from the corners of the mouth, }	2	6
	<hr/> 17	<hr/> 3

Making the whole length, from the tip of the head fins to the tip of the tail, seventeen feet and three inches.

The breadth from the extremity of one pectoral fin or wing to the other, measuring along the line of the belly, 16 feet.

When measured over the convexity of the back, 18 feet.

The skin of the back was brown approaching to black; of the belly, black callicoeed with milk-white. The whole surface during life was slimy. There were neither scales nor spinous processes, nor proper prickles, on any part of it; but the whole exterior was roughened by asperities resembling, in most parts, the sharpest grit adhering to the skin of a shark, and in others, the form not quite so sharp, of shagreen. The skin was remarkably strong and tough.

The mouth nearly terminal, and not situated on the under side. Its breadth from corner to corner was two feet and nine inches. There were two upper lips, an outer and an inner, and both destitute of teeth. There was a single lower lip, be-

set with small rough processes, resembling those of a rasp, instead of teeth. There was in this huge mouth no appearance of a tongue.

There were five branchial openings on each side beneath ; and these were protected by as many gill-covers. These openings and their covers were of different lengths, from twelve to twenty-four inches. The breadth of the opercula varied from seven to ten inches. The arches supporting the gills were attached within, the divisions of both extensively ramified, and the organization of the branchiæ more exquisite and elegant than I had ever seen. The distance from gill to gill, across the roof of the mouth, varied from one foot and eight inches to three feet and nine inches.

The greatest breadth of the skull or osseous part of the head was five feet. The distance between the eyes, 4 feet 2 inch.

Distance between the nostrils, 2 3½

Distance between the eye and ear, . . . 0 11

. . . . eye and nostril, . . 1 1

. . . . corner of the mouth and eye, 1 1½

On each side of the mouth there was a vertical fin two feet and six inches long, twelve inches deep, and two inches and a half thick in the middle, whence it tapered toward the edges, which were fringed before with a radiated margin. Each contains twenty-seven parallel rows (not radiations) of gristle or cartilage. The natural flexibility and elasticity of these were greatly increased by articulations alternating with each other through every gristle and every part of the texture. Motion was communicated to these cartilages by muscles situated between them and the common integuments which enveloped them with admirable effect. The fin or organ so constituted could, from its flexibility, bend in all directions, and be made in many respects to perform the function of a hand ; so as, by twisting round, to seize an object and hold it fast. The phalanges of this fin were attached by strong ligaments to the upper jaw, and to the point of articulation with the lower. These two organs, situated one near each angle of

the mouth, perform, no doubt, important functions in the animal. They were five feet nine inches apart, and could almost be made to meet in front of the mouth, or could be bent into it.

There was no proper bone in the skeleton, except in one spot, a hump or knob, about the size of a hen's egg, at the root of the tail behind the dorsal fin. Even the vertebræ manifested nothing more than specks of osseous matter, distributed irregularly through the gristle. Every part could be easily cut with a knife; for its constitution very much resembled the substance of a sturgeon's nose.

The case or cavity that contained the brain was a sort of ellipsis, measuring twelve inches and a half by eighteen; and its upper side was destitute of cartilages; and like the fonticella of infants, covered by the common integuments only for the space of five inches and a half by seven. The heart consisted of a single auricle and a single ventricle, as in other fishes.

The eyes were situated near the projecting angles of the head; and the humours contained in a cartilaginous receptacle resembling an egg-cup, or an eye-glass, with the optic nerve entering one side of the base.

The nostrils were just within the upper lip, covered by a membrane, which membrane more than covered the whole lip, for it extended inwards towards the palate four inches near the corner of the mouth, and was two inches broad about midway.

There was one dorsal fin, somewhat forward of the root of the tail. It was of a triangular form and consisted of thirty-six rays. In lieu of a second dorsal fin, there was a lump, bunch, or callous knob, a few inches behind it. The tail was covered with rather a coarser set of eminences, like a file or rasp, than the other parts, and they were not so keenly scabrous. There was no caudal fin at the end, nor any aculeus or sting on the upper side, near the junction with the body.

The wings, flaps, or pectoral fins, were of a very curious organization. There was a scapula, humerus, ulna, carpus, and an uncommon number of phalanges, of the before-mentioned cartilaginous structure. All these limbs, or joints, were

articulated with each other ; but the articulations, like those of the human sternum, had very little motion. This series of stiff joints was fixed in the flesh, and proceeded somewhat obliquely backward. Instead of moving like the leg of a beast, the arm of a man, the fin of a fish, or the wing of a bird, it seemed to serve the purpose of a basis for other organs of motion ; at least as far as the scapula, humerus, and ulna were concerned. It had more analogy to the wing of a bird than to any thing else ; and yet so different from it, as to manifest a remarkable variety of mechanism, in organs intended substantially for the same use.

Fish of the kind now under consideration, may be aptly denominated *submarine birds* ; for they really fly through the water as birds fly through the air. I have seen fishes of this organization perform their flights by flapping their wings after the manner of crows, hawks, and eagles, in their progress.

From this articulated but fixed anterior extremity, as it may be termed, proceeded obliquely backward seventy-seven rows of cartilage of different lengths, but of almost same parallelism, and not at all radiated. They were all articulated, and the joints were very numerous. In the longest row they amounted to twenty-seven, and in the shorter ones, they were proportionally few ; the cartilages and their articulations were so alternated and diversified, that they, with the yielding and bending quality of the cartilage, were susceptible of all manner of flexion, and enabled the fish to assume all the attitudes requisite for its life and habits.

The contrast between the wing of a bird and of such a fish is curious :

<i>In a Bird,</i>	<i>In this sort of Fish,</i>
The anterior extremity is free or loose.	The anterior extremity is fast or confined.
There are few or no phalanges.	* The phalanges are numerous and answer the purpose of ventral fins.

The motory organs growing out of them are quills. These quills are rigid and jointless.

They are hollow at one end and are furnished with a raphis.

They are exposed to the atmosphere.

The motory organs growing out of them are cartilages. Those cartilages are flexible and articulated.

They are solid throughout and furnished with muscles.

They are covered by the common integuments.

In one of these wings, or pectoral fins, the number of joints amounted to six hundred and twenty-three; from which some judgment may be formed of the vast variety of motions these organs are capable of performing, and how admirably they are adapted to connect strength with speed.

We can hence understand the reason, why they fly swiftly and powerfully through the water; why they can raise a spray or foam around them when they flap their wings on the surface; and why they are able, huge as they are, to gambol with agility, and even to leap entirely out of water, for a considerable distance.

There were two openings on the upper side, as is usual in fishes of this genus; conjectured to be ears, or appendages to the organ of hearing.

It was remarked that this creature and others of the species are attended by small fishes, as sharks are by their pilots, ductores or satellites. One of them was seen to enter the mouth and pass out familiarly and easily through the ears and gill-openings. But, all efforts to catch them were ineffectual. It is hoped the next expedition will be successful.

The individual brought here this time was a female. There was a uterus large and distinct. The species is viviparous, for another female that was struggling after having been wounded, brought forth in her agony, a living young one, as Capt. Potter related; and Mr. Patchen, while he showed me the orifices through which sucking is probably performed, declared

that on dissection, mammary organs were found, which discharged as much as a pailful of milk. Captain Bebee was also a witness of these particulars.

As these animals are said during the summer and autumn, to visit our southern coast, it may be expected we shall obtain further and more particular information concerning them. On this occasion I have seized the opportunity that presented to make a memorandum by which the vampyre of the ocean, or this sort of submarine bird, may henceforward be known by naturalists.

After the description given it will be rationally expected I should name the fish.

I am averse to the unnecessary multiplication of genera: the indulgence of an inclination to minute divisions and subdivisions, I consider one of the misfortunes of modern science.

This enormous individual belongs to the order Selacian, of the great section comprehending the cartilaginous fishes. Its configuration and structure place it in the numerous family of *Raja*; but it is incapable of holding a place in any of the divisions that now exist in the genus; for it cannot be ranked among *Rays*, which have sharp noses, nor those whose heads are rounded, or horned; nor with such as have mouths furnished with hexagonal, or pointed teeth, or tails armed with stings, or supplied with fins.

I find the generic name *Cephalopterus* in the books, which denotes the existence of *fins upon the head*. I am willing to adopt this term, as sufficiently significant. It remains to find a specific denomination. This fish being perhaps the largest of the rays, as the vampyre is of the bats, or vespertilio, the name *vampyrus* may be attached. So the creature may be distinguished as the *Cephalopterus vampyrus*.

DESCRIPTIONS of some new or rare PLANTS from the Rocky Mountains, collected in July, 1820, by Dr. Edwin James.

By JOHN TORREY, M.D. Read before the Lyceum, Sept. 22, 1823.

AMONG the many valuable discoveries in Natural History, made by the scientific gentlemen attached to the late expedition to the Rocky Mountains, commanded by Major Long, those relating to the department of Botany are not the least interesting. Dr. Edwin James, who was the botanist in this hazardous journey, and whose zeal in prosecuting his favourite science is so well known, having been called to accompany another expedition, from which it is uncertain when he will return, has kindly permitted me to commence the publication of the discoveries he made; particularly of the plants from the summit of the Rocky Mountains, as well as the whole of the GRAMINA. Owing to my having but part of Dr. James's collection in my possession, it is impossible to preserve much order in the arrangement of the plants I shall describe; they will therefore be published in occasional DECADES, as I find leisure to determine them.

1. *ANDROSACE carinata*.* Tab. III. f. 1.

A. foliis congestis ovato-lanceolatis acutis integerimis carinatis, margine ciliatis, umbella pauciflora, foliolis involucri lineari-oblongis, corollâ calycem ovatum excedente, laciniis obovatis integerimis.

Description.

Root perennial. *Leaves* crowded into a roundish bulb about the root, somewhat spreading, thick and rather coriaceous, scabrous, carinate beneath by the prominent midrib; margin fringed with hairs. *Scape* from one half to three quarters of an inch in height, villose, slender, five-flowered. *Calyx* short-ovate villous; segments oblong, obtuse, very entire. *Corolla* white, as large as in *A. villosa*; tube about as long as the calyx, ovate; segments obovate, entire; throat nearly

closed with minute glands. *Stamens* very short; *filaments* inserted into the tube of the corolla, naked; *anthers*, oblong, yellow. *Germen* globose; *style* shorter than the *stamens*; *stigma* simple. *Seeds* not seen.

HAB. On James' Peak, one of the highest of the Rocky Mountains, 10,000 feet above the level of the ocean, near the region of perpetual snow. Flowers in July.

OBS. This species resembles *A. villosa* in some respects, but is easily distinguished by its nearly naked, acute, and carinate leaves.

2. *OXYRIA reniformis* R. Brown.

GEN. CH. *Perianth.* simplex 4-phyllum, foliolis 2 interioribus majoribus. *Nux* triqueter, margine lato-membranaceo. *Embryo* erectus invertus. *R. Brown* in *App. Ross's Voyage*, ed. 2. v. II. p. 192. *Hill Syst. Veg.* X. p. 24. *Hook. Fl. Scot.* p. 99. *Decand. Syn. Fl. Gall.* p. 194 (subgenus). **DONIA.** *R. Br.* in *App. to Ross's Voy.* ed. 1. p. 142. **RHEI** *sp. Wahl.* **RUMICIS, sp. L.** **HEXANDRIA** *Digynia.*

O. reniformis *R. Br.* l. c. *Hook Fl. Scot.* l. c. p. 111. **RUMEX** *digynus* *L. Willd. Spec. II.* p. 258. **RHEUM** *digynum* *Wahl. Fl. Lapp.* p.

Root perennial. *Stem* 2-3 inches high, with one small leaf. *Radical leaves* few, on long petioles, reniform, (not emarginate,) with ovate, truncated *stipules* at the base. *Raceme* somewhat paniced; branches all stipulate at the base. *Pedicels* incrassated upwards. *Flowers* very minute. Exterior leaves of the *calyx* oblong; the interior ones obovate, nearly as long again as the others. *Corolla* o. *Stamens* 2; *filaments* as long as the *calyx*; *anthers* oblong. *Germen* orbicular, notched; *styles* 2, very short; *stigmas* large, plumose, purple. *Nut* not seen.

HAB. With the preceding.

OBS. The only locality of this plant in North America, hitherto recorded, is Labrador, where it was found by *Colmaster*. It is a native of the high mountains and most north-

ern parts of Europe. Though possessing many of the characters of *RUMEX*, it appears to differ sufficiently to be considered as a distinct genus. *Wahlenberg* supposes it to be a *RHEUM* with a third part of the fructification suppressed. The American plant may yet prove a different species from the European; being much smaller, the flowers uniformly diandrous, and the leaves not emarginate; in which case it may be called *O. diandra*.

3. *ADOXA Moschatellina* L.

Peduncle about 4-flowered. *Stamens* 8; *filaments* united in pairs at the base; *anthers* subrotund, 1-celled, (or, rather, as *Hooker* is disposed to consider them—stamens 4, forked; each ramification bearing a single-celled anther). *Calyx* 3-cleft. *Corolla* 4-cleft; segments ovate. *Styles* 5.

HAB. With the preceding.

Obs. This plant, the only species of the genus, is now for the first time introduced as a native of the continent of America. The specimens presented to me by *Dr. James*, resemble in almost every respect those in my herbarium from various parts of Europe.

4. *POTENTILLA nivalis*.* Tab. III. f. 2.

P. caule erecto herbaceo apice unifloro, foliis pinnatis, foliolis 2-3-lobis confluentibus, lobis acutis, margine pilosociliatis, petalis subrotundis calyce longioribus.

Description.

Root perennial, creeping, thick, and fuscous. *Stems* few, simple, about 3 inches high, minutely pubescent, 1-flowered at the summit; base covered with the withered leaves of preceding years. *Radical leaves* numerous, equally pinnate, many-paired; petiole winged by the decurrent *stipules*; *leaflets* crowded and a little overlapping each other, so as to appear imbricate, punctulate, the lower ones ovate, often entire; upper ones broader, 2-, and often equally 3-lobed; lobes somewhat spreading, acute, entire, naked,

except on the margin, which is somewhat ciliate with hairs. *Flower* terminal, erect, about half an inch in diameter. *Calyx* 10-cleft, hairy; exterior segments a little shorter, lanceolate, acute; interior segments ovate-lanceolate. *Corolla* 5-petalled, yellow; *petals* nearly round, very entire, about one-third longer than the calyx. *Stamens* very numerous; *filaments* smooth; *anthers* round. *Receptacle* hairy.

HAB. With the preceding.

This species appears to be quite distinct from any described in the learned and accurate "Monographia generis POTENTILLARUM" of *Lehmann*, published in 1820; or in any subsequent work with which I am acquainted.

5. *Myosotis nana*. *Villars*?

M. sericeo-villosissima, foliis ovatis oblongisque obtusis integerrimis congestis, racemo paucifloro, seminibus læviusculis, margine integerrimis.

Plant caespitose, perennial, less than an inch in height. *Stem* erect, nearly simple. *Leaves* densely covered with a long silky villus; those about the root crowded into a roundish tuft, ovate; stem-leaves few, oblong. *Raceme* 4—5-flowered; flowers alternate, on pedicels shorter than the bracts at their base. *Calyx* deeply 5-cleft; segments linear-lanceolate, obtuse. *Corolla* one-third longer than the calyx; tube ovate, yellow; segments blue, ovate, rather acute, erect? throat closed with glands. *Stamens* opposite to the segments of the corolla; *filaments* very short, naked; *anthers* didymous, oblong. *Style* short, straight; *stigma* capitate. *Seeds* ovate-oblong, nearly smooth, but not shining, entire on the margin.

HAB. With the preceding.

Perhaps distinct from the *M. nana* of *Villars*,† a native of

† *M. nana*: foliis oblongo-lanceolatis villosis, racemis paucifloris inferne foliosis, nucibus margine crenulato-dentatis *Lehm. Asperif.* p. 108. *Willd. Spec.* I. p. 747.

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some of the high mountains of Europe. I have no opportunity of consulting the figure of that species quoted by *Willdenow*, nor have I seen specimens of it; so that I am not confident respecting its identity with the plant discovered by Dr. JAMES.

6. *PRIMULA angustifolia*.* Tab. III. f. 3.

P. foliis elliptico-lanceolatis integerrimis glabris, scapo 1-floro, corollæ laciniis ovatis integerrimis.

Root long, thick, imbricated with the vestiges of leaves.

Leaves elliptico-lanceolate or oblong, sometimes spathulate, petiolate, about an inch long, obtuse, membranaceous, veinless; margin very entire. *Scape* solitary, shorter than the leaves, with a subulate bract a little below the flower. *Calyx* cylindrical-oblong, 5—6-cleft, smooth; segments subulate, erect. *Corolla* purple, sub-campanulate; tube one-third longer than the calyx; border erect-spreading, with ovate, obtuse, very entire segments. *Stamens*, in the tube of the corolla; *filaments* very short; *anthers* oblong, 2-celled. *Style* 1, straight, persistent; *stigma* globose. *Capsule* ovate.

HAB. With the preceding.

Resembles *P. integrifolia* in many respects, but the leaves are narrower, the segments of the calyx acute, &c. In the capsule and in the entire segments of the corolla, it is allied to *ARETIA*, but the orifice of the tube is not glandular.

7. *POLYGONUM viviparum* β. *capitatum*.*

P. caule simplici monostachyo, foliis linearibus glabris margine revolutis, spica brevi-ovata crassa, bracteis ovatis acuminatis.

Stem simple, slender, about 8 inches high. *Leaves* few, a little pubescent beneath; margin conspicuously revolute.

Stipules oblong, obtuse, entire. *Spike* terminal, about

three-fourths of an inch long. *Flowers* on short slender pedicels. *Bracts* fuscous, broad-ovate, shorter than the flowers. *Perianth* 5-parted, segments oblong, obtuse. *Stamens* 8, as long as the perianth; *filaments* compressed; *anthers* oblong. *Germen* triangular; *style* deeply 3-parted; *stigmas* simple, very minute.

HAB. With the preceding.

The European variety of this plant differs in having a cylindrical spike, which generally bears small viviparous bulbs. The *P. viviparum* has hitherto been observed in North America only in the localities mentioned by *Pursh*, and on the White Hills of New-Hampshire, where it was discovered in 1816, by *Francis Boott*, Esq.

8. *TRIFOLIUM nanum*.* Tab. III. f. 4.

T. capitulis paneifloris umbellaribus, leguminibus 4—5-spermis, cal. glabris dentibus subæqualibus, foliolis obovato-oblongis acuminatis, caule cespitoso erecta.

Perennial, about an inch and a half high. *Leaves* ternate, very smooth; leaflets with prominent veins beneath, acuminate, or rather cuspidate, dentate-serrate. *Flowers* about 3, very large, purple, each on a short pedicel. *Calyx* subcampanulate; teeth nearly equal, lanceolate, acute. *Vexillum* three times as long as the calyx, oblong, persistent? *Legume* sometimes 6-seeded.

HAB. With the preceding.

Flowers remarkably large in proportion to the plant.

9. *PENTSTEMON alpina*.*

P. glaberrima, corolla subcampanulata limbo subæqualiter 5-lobato, foliis oblongo-lanceolatis margine crenulato-denticulatis, calycis segmentis lanceolatis acutis, antheris hirsutis, filamentis sterilibus 2 superioribus brevioribus sub apicem retusum barbato.

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Root coarsely fibrous. *Stem* 6 inches high, very smooth, terete. *Leaves* opposite, sessile acute, slightly glaucous; the lower ones narrow at the base. *Peduncles* many-flowered. *Calyx* very smooth. *Corolla* an inch in length, blue, tubular-campanulate. *Anthers* large, hairy. *Sterile filament* longer than the inferior stamens, but shorter than the superior ones, smooth, slender, dilated at the apex, with a retuse point, which is bearded beneath.

HAB. With the preceding.

An intermediate species between *P. erianthera* and *cœrulea* of NUTTALL. From the former it differs in the form of the leaves and segments of the calyx; and from the latter in the hairy anthers, &c.

10. *CAPRARIA pusilla*.*

C. pubescens, foliis oppositis cordatis repando-dentatis petiolatis, pedunculis axillaribus petiolo longioribus.

Annual. *Stem* very slender, branched, about two inches high. *Leaves* about one-third of an inch long, broad-cordate; petioles shorter than the leaves. *Peduncles* filiform, 1-flowered. *Calyx* tubular-campanulate, with 5 acute, erect teeth. *Corolla* campanulate, white, more than twice as long as the calyx; border with 5 obtuse lobes. *Stamens* didynamous, much shorter than the corolla; *anthers* roundish. *Germen* oblong; *style* filiform; *stigma* 2-lobed.

HAB. With the preceding, and on the sides of the Rocky Mountains, in crevices of rocks.

Allied to *C. humilis* of the East Indies.

EXAMINATION of a MINERAL, from Andover Furnace, Sussex County, New-Jersey. By JAMES RENWICK, Professor of Natural and Experimental Philosophy and Chemistry in Columbia College. Read Oct. 20th, 1823.

THE substance in question was found by Charles Kinsey, Esq. of Essex, while engaged in collecting the minerals adjacent to the route of the Morris canal. I have also been lately informed, that it was brought from the same place several years since by Col. Gibbs, to whom the merit of an earlier discovery is in consequence due. It exists intimately connected with, and disseminated through the ore of the Andover mine; an ore that was at one period famous for producing the best iron in North America, and the only kind from which steel has been successfully manufactured.

This ore appears, at the first glance, to be composed of three very distinct substances. The first is intermediate in appearance between the granular Franklinite and the large-grained magnetic iron ore of Gov. Dickerson's mine at Succasunna: on a cursory examination, it seems to be a protoxide of iron, with a slight trace of zinc. The second is an amorphous quartz, tinged with a colour varying from a pale rose-colour to a deep vermilion. The third is of a dull vermilion red, and of a granular fracture; in some specimens fine, in others coarse grained. This last was chosen as the subject of examination; it is hard enough to scratch glass; its powder is rose red; it slightly affects the magnet; and it effervesces with acids. It had been supposed by Judge Kinsey, who found large quantities of the cadmia among the scoria of the Andover furnace, that it might be a red oxide of zinc. My first experiments showed that it had no analogy with that substance, and it having been subjected to the action of the blow-pipe by Dr. Torrey, he inferred that it might contain Cerium, as it formed with borax a glass that was green while hot, but

lost its colour on cooling. Exposed alone to the blow-pipe, it is infusible.

To ascertain its nature, it was subjected to the following preliminary process :

A.

(1) A small portion was separated, and reduced to fine powder in a steel dish. In this state it was acted upon with violent effervescence by nitro-muriatic and muriatic acids ; giving with the latter the peculiar smell of hydrogen. The action ceased in about half an hour, leaving a considerable part of the mass undissolved, and but little altered in appearance.

The muriatic solution being acted upon by tests, showed, among others, the following phenomena :

- (2) With ferrocyanate of potassa a copious blue precipitate.
- (3) With ammonia a precipitate of a rich vermilion red.
- (4) With carbonate of ammonia a reddish white precipitate.

(5) With hydrosulphuret of potassa, a milky appearance, that, subsiding, left a scanty brown precipitate.

(6) The compounds of cerium being soluble in excess of acid, the nitro-muriatic solution was concentrated until the greater part of the free acid had evaporated, and was then neutralized to the point of nascent precipitation by carbonate of soda.

(7) A part of the liquor in No. 6 being diluted, crystals of sulphate of soda were thrown in ; these after some hours were dissolved, causing a white precipitate.

(8) To another portion of the concentrated and neutralized nitro-muriatic solution (6) tartrate of potassa was added, on which a copious white precipitate ensued.

The suspicion that the substance contained cerium being thus confirmed, it was subjected to a more strict examination, as follows :

B.

(1) A mass weighing nearly an ounce, and containing a very few small grains of the oxide of iron, was broken from the corner of one of the specimens. Weighed by means of a very accurate hydrostatic balance, it appeared to have a specific gravity of 3.25.

(2) This mass being first crushed into fragments in a steel mortar, all the extraneous matter was carefully picked out with a forceps: it was then reduced to impalpable powder, by long grinding in an agate dish.

(3) Fifty grains of the powder were boiled for half an hour in nitro-muriatic acid, the solution assumed a rich yellow colour, and a considerable residuum was left, which, separated, washed, and dried, had lost in weight exactly 27 grains.

(4) The insoluble portion (3) was then put into a silver crucible, with 70 grains caustic potassa; water being thrown on, the mixture was boiled, evaporated to dryness, and finally fused. The fused mass was softened by water, and separated from the crucible; muriatic acid being then added, the solid matter swelled up into a gelatinous mass. This was evaporated to dryness, being constantly stirred throughout the process, and afterwards boiled for two hours in very dilute muriatic acid. The whole was then thrown upon a filter, and carefully washed; the insoluble portion, when dry, was found to weigh 16.3 grains, was white, with a faint and hardly perceptible tinge of rose colour.

(5) The nitro-muriatic solution and washings, (3) and the muriatic solution and washings, (4) having been mixed, liquid ammonia was added in excess, which threw down a red precipitate; the supernatant clear liquor was poured off, the residue thrown on a filter and washed, and the liquor with the washings set by, for further experiment. See (12).

(6) The precipitate (5) was redissolved in a small quantity of muriatic acid, and the solution concentrated; tartrate of

potassa was added until effervescence ceased, when crystals of tartaric acid were thrown in, by which a copious white precipitate was produced.

(7) This precipitate (6) was decomposed by heat, which being pushed too hastily, a portion of charcoal was left; lest any carbonate of potassa should be present, in consequence of a portion of the precipitate (6) being the difficultly soluble bitartrate of potassa, the mass was washed with very weak vinegar. To separate the carbon, the mass was again acted upon by a small quantity of muriatic acid, and the solution filtered.

(8) The new muriatic solution was decomposed by ammonia, which threw down a red precipitate, that when washed and dried, weighed 6.16 grains.

(9) Lest the acetic acid (7) had carried off any part of the mineral, it was tested with ammonia, but no precipitate ensued.

(10) Into the liquor remaining after precipitation by tartrate of potassa and tartaric acid (6), ferrocyanate of potassa was dropped; a milky appearance first took place, and finally a copious precipitate of a pale blue colour. This precipitate, when dried, weighed 28.9 grains; which, supposing it to be a ferrocyanate of the protoxide of iron, and its equivalent number 99, gives on reduction 10.5 grains protoxide of iron.

(11) To the liquor yet remaining, (10) carbonate of ammonia was added: a white powder was thrown down, weighing 1.84 grains.

(12) The ammoniacal liquor, and washings after the first precipitation (5) were boiled for an hour, but no precipitate ensued; being then acted upon by carbonate of soda, a greyish precipitate fell, weighing, when dried, 20.92, and manifesting the presence of 12.04 grains caustic lime.

C.

(1) Another portion of the powdered mineral was exposed for an hour to a red heat, in a platina crucible; its weight was reduced from 50 to 48.25 grains.

(2) It was then treated as before (B. 3), with nitromuriatic acid, the insoluble portion fused with caustic potassa, &c. as in (B. 4), and the whole of the liquors united, as in (B. 5). The mixture was then concentrated to separate the excess of acid, and again diluted with water. Crystals of Sulphate of Soda thrown in, were after a few hours dissolved; a precipitate ensued, which, washed and dried, weighed 8.62 grains. If the representative number of Cerium be 92, this, when reduced, will give 6.06 grains of Peroxide of Cerium.

(3) The liquor whence the Cerium had been precipitated, (2) being tested by the Oxalate and Benzoate of Ammonia, showed the presence of Lime and Protoxide of Iron.

The more important results of the analysis B being thus confirmed, it was not considered necessary to extend the process farther. The results may be, it is believed, depended upon, except so far as the equivalent numbers of Ferrocyanic Acid and Cerium enter into the calculations of (B. 11), and (C. 2), and the doubt whether a small proportion of some other metal may not have been thrown down in (B. 11). This analysis shows the following to be the constitution of the substance.

Silex	B. (4)	16.30 grains.
Peroxide of Cerium	B. (8)	6.16
Protoxide of Iron	B. (10)	10.50
Alumine	B. (11)	1.84
Lime	B. (12)	12.04
Water	C. (1)	1.75
Loss		1.41

50.00 grains.

As this mineral neither agrees in external characters nor chemical constitution with any other compound of Cerium, that has been hitherto described, I have little hesitation in announcing it as a new ore of that metal. It appears to possess the nearest analogy in its composition with the AL-LANITE. This last, by the analysis of Thompson, quoted in Macneven's edition of Brande's Chemistry, has in 50 parts,

Silex	15.80
Oxide of Cerium . .	15.13
Alumine	1.83
Protoxide of Iron . .	11.34
Lime	4.11
Water	1.79

50.00

If my surmise in this respect be true, I should propose to name it the *Torrelite*, in honour of my friend, Dr. John Torrey, to whom mineralogical science is under many important obligations, and to whom this tribute is fairly due, as it is to his nice tact in the management of the blow-pipe that the discovery of Cerium in the substance is to be attributed.

EXAMINATION of the ACID of the RHUS GLABRUM, with Observations on the Juice of the SAMBUCUS CANADENSIS, as a delicate test. By ISSACHAR COZZENS, Manufacturing Chemist. Read October 6, 1823.

THE berries of the *sumach* (*Rhus Glabrum*) ripen in the month of November, forming large clusters of a bright red colour. These have been long known to yield a powerful acid, which is sometimes used by the country people for medicinal purposes, or as a substitute for lemons to make a pleasant beverage. It is also extensively used to convert cider into vinegar.

To determine the nature of this acid, I made the following examination :

1. A strong infusion of the ripe berries was made by pouring warm distilled water on them, and using a fresh portion of berries, until a very acid liquor was obtained.

2. This liquor was filtered, and a solution of potassa added to it till it became neutral. To ascertain whether the acid was the tartaric, another portion of the acid liquor was added ; but no crystals of supertartrate of potassa were formed.

3. Another portion of the acid was saturated with carbonate of lime ; this was filtered and concentrated, a salt of lime was formed, which was insoluble in cold water, but dissolved readily in water boiling hot. To the solution in boiling water, alcohol was added, which gave a beautiful coagulated white precipitate. This, when dried, was readily dissolved in hot water.

4. The acid solution was then treated with subnitrate of mercury ; it formed a dirty white precipitate.

5. With acetate of lead, it produced the same result.

6. With sulphate of iron, a small portion of gallic acid was detected.

From these experiments I conclude that the acid of the sumach is the MALIC, and that it is nearly pure, being only contaminated with a small portion of gallic acid, which probably proceeds from the pulp of the berries.

On carefully inspecting the sumach berries, they are seen to be clothed with a down or pubescence, and the acid principally resides in this substance ; for after it is washed off by warm water, the berries are entirely free from any acid taste.

I shall conclude this part of the paper with a process for preparing with very little trouble, a pure malic acid from these berries, which may be used for some of the purposes of the citric acid.

Process. Rub the berries in boiling rain or distilled water ; filter the liquor, and evaporate it in a *well tinned* vessel,

to the consistence of a syrup, taking care not to burn it. Then add to it an equal quantity of alcohol; this will unite with the acid, leaving the mucilage and other impurities behind. An equal quantity of water is now to be added, and the whole distilled to obtain the alcohol. The malic acid will be left in the retort, which may be poured out when cold.

I have also examined the juice of the elder-berries, which seems to possess important properties as a delicate reagent. The following process was employed :

Take any quantity of the ripe berries, picked clean from the stalks, and after having bruised them, press the juice into a clean well tinned vessel. Add a fourth part of its weight of alcohol, and evaporate the mixture to about one-half. Remove it from the fire for ten or twelve minutes, and add as much alcohol as you have of concentrated juice. A copious precipitation of the parenchymatous and gummy parts will take place, which will permit the liquor to be strained with ease through a fine cotton cloth.

The filtered liquor is now fit for use. It consists of the saccharine and colouring principles of the berries, in solution with alcohol and water. It is of a beautiful violet colour. In order to ascertain its utility as a test of acids and alkalies, the following experiments were made :

To one pint of rain-water a single drop of the tincture of elder-berries was added. The blue colour was too pale to be perceived; but the addition of a single drop of sulphuric acid produced a decided red colour.

To the liquor employed in the last experiment, a minute quantity of alkali was added, when it immediately changed to a bright lively green. If a quantity barely sufficient to neutralize the acid be employed, the original blue or violet colour is restored; hence this test possesses all the delicacy of the tincture of litmus, or blue cabbage, and has this additional valuable property of keeping unaltered, during the hottest season of the year.

I have examined in a similar manner the juice of the pokeberry, (*Phytolacca decandra*,) but without the same interesting result. I hope, however, soon to be able to exhibit a method of employing it with advantage in the manufacture of the pigment termed *lake*.

NOTE on the Organic Remains, termed BILOBITES, from the Catskill Mountains. By J. E. DEKAY, M.D. Read October 13, 1823.

THE science of Oryctology, which formerly was confined to a bare indication of such fossils, as, from the singularity of their form, attracted the attention of the curious, has now become an interesting branch of knowledge. The importance of these *medals of nature* in aiding the geological inquirer, is obvious. The recent observations of Humboldt* have given additional interest to this subject. He has endeavoured to determine, with more precision, the proofs afforded by the presence or absence of certain remains, and by establishing in a more positive manner the value of zoological characters in identifying particular strata, has exhibited in a clearer point of view their utility, as connected with the science of geology. It is not the object of the present communication to examine these interesting connexions, but simply to indicate the existence of several apparently new and undescribed organic relics.

Among the numerous fossils in the cabinet of the Lyceum, several are labelled under the name of Bilobite. They were collected and presented by our corresponding member, Mr. Pierce, and are said to be found in the Totoway mountain in New-Jersey, and at Cairo in the Catskills.

* *Essai Geognostique sur le Gisement des Roches dans les deux hemispheres.* Paris, 1823.

The name of Bilobite is not to be found in any modern work on Oryctology ; and it is probable that its application in this instance has been suggested by its peculiar appearance.

With a view of calling the attention of naturalists to this subject, the following account is laid before the Society.

They are imbedded in a loose friable sandstone which seems to be almost wholly composed of organic remains, such as productus, terebratula, &c. The region is secondary, and is described by Mr. Pierce, in vol. II. of Silliman's Journal, to which we refer the reader. The explanatory figures, (see Plate V.) would seem to indicate at least two distinct species ; but the following description may be considered as applicable to all the specimens hitherto examined.

The general outline may be considered as elliptical, one extremity being much narrower than the other. This small extremity, for the convenience of description, will be termed the anterior extremity. The length varies from one and two-tenths, to one and a half inches. The average thickness about five lines.

The superior or dorsal surface is divided into two unequal lobes by a longitudinal furrow, in the course of which a raised zigzag line is observed. In fig. 1. this line is most obvious at the anterior extremity ; in figs. 2. and 3. it is entirely wanting.

The lobes, with respect to each other, are unequal in extent and thickness. They gradually become thinner towards the circumference, and more particularly towards the posterior extremity. The lobes are marked transversely by 18—30 distinct elevated lines or costæ, which become more elevated as they approach the raised zigzag line. These costæ do not terminate at the edges, but are continued at the anterior extremity on the undersurface. Faint longitudinal impressions are observed, at unequal distance crossing the transverse costæ nearly at right angles. The inequality of the lobes is not always constant : thus, at figs. 1. and 3. the left lobe is the largest ; at fig. 2. the largest lobe is on the right. The other lobe of

this figure is compressed in such a manner as to produce a crest, and approximating it nearly to the figure of a Trilobite.

The under surface is extremely irregular. The edges, as before mentioned, are very thin, and are elevated about two lines above the inferior surface; this, however, is not uniform throughout its whole circumference; the anterior extremity, comprising one-third of the whole fossil, is without such a raised border. In this part, the costæ of the dorsal surface are continued beneath, and meet each other at angles of about 45° . The line of junction has not yet been made visible by the most careful dissection. The remaining two-thirds, or posterior part of the under surface, presents a series of concentric lines, interrupted as at fig. 4. by a carina directly beneath, and in the direction of the superior or dorsal furrow.

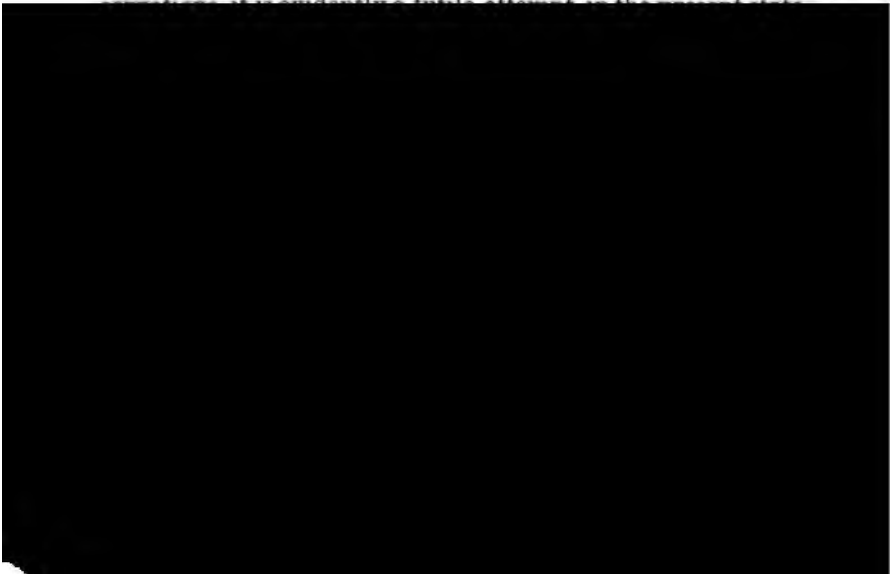
Various conjectures have been hazarded respecting the origin and nature of these organic relics.

A perusal of the learned work of Brongniart* on the Trilobites connected with their peculiar appearance, led to an investigation whether they might not be analogous productions belonging to the order of Crustacea, but without any satisfactory result. Neither eyes, nor antennæ, nor feet, could be detected, after a careful investigation, and dissection of several specimens. They have been by many supposed to be the leaves of plants, such as Ferns, &c.; but their thickness, and perhaps their association, with decided animal remains, would weaken this conjecture.

Another opinion, which is advanced with diffidence, is, that these remains may be moulds or casts of an extinct species of *Cardium*. This belief has been strengthened by an examination of the *Cardium hibernicum*, as figured in Sowerby's *Mineral Conchology*, vol. I. p. 187. pl. 82. With these views, the

* *Histoire Naturelle des Crustacés fossiles, &c.* par Alexandre Brongniart, Paris, 1822.

lower part of fig. 3. must be considered as corresponding to the posterior slope or areola of the cardium, the upper portion as corresponding to the anterior slope or area, and the dorsal furrow, figs. 1. 2. 3. to the base. The transverse costæ may be supposed to correspond with the longitudinal furrows on the surface of the cardium, and continued to what has been described as the anterior part of the inferior surface of the Bilobite. The raised zigzag line may be considered as formed by the terminations of the costæ of the shell not being exactly applied to each other, and thus leaving an intermediate substance between them. Perhaps a clearer idea may be conveyed, by supposing a cardium to be compressed in the direction of a line drawn from the beaks to the base, so as to bring these parts nearly into contact. A question then arises, whether this apparent compression is accidental, or characteristic of a species? It has been urged, that shells, from their usually delicate and brittle texture, cannot be distorted without injury; but it is well known, that Echini, &c. which are equally delicate, are often found in this state. That this compression is not accidental, is, it is supposed, evident from the fact, that all these Bilobites have the appearance of being compressed in a similar direction, a character which is too constant to have been occasioned by accidental causes. From these ob-



very much altered, I have had ample proof by specimens from several parts of our country. In the rocks of the Missouri, many specimens of a species of Terebratulite, common there, may be found in some instances depressed, and in others compressed to various degrees of flatness; they occur, indeed, in almost every irregular shape. The zigzag line is evidently the line of junction of the valve. This line may be traced round the ends of the specimen, to the termination of the elongated hinge margin, the separating line of which is, as it ought to be, rectilinear; the concentric and other lines on the under surface may with some difficulty be traced to their proper situation in this genus; the umbones, or rather the apex of the shell is concealed by the remains of the matrix."

Among so many conflicting opinions, it is hoped that zoologists will turn their attention to this interesting subject. A farther investigation of these organic remains, aided by more complete specimens, will, it is hoped, enable naturalists to develop more completely their structure, and assign their proper place in the kingdom of nature.

DESCRIPTION of a new species of FISH, from the Hudson River.

By DE WITT CLINTON, LL.D. Read Sept. 29th, 1823.

Sub genus OLUPEA. Cuvier.

THE maxillaries arcuated anteriorly, divided longitudinally into many pieces; opening of the mouth moderate, not wholly furnished with teeth, often toothless; the dorsal above the ventrals.

OLUPEA *hudsonia*.*

Pl. II. fig. 2.

With a broad satin stripe extending from the gill covers to the tail, and a dark rounded spot at the base of the tail.

Frequent at Albany, and other places on the Hudson River. Cabinet of the Lyceum.

Head rather small; *mouth* moderate; *lower jaw* shorter, and shuts into the upper; *rostrum* obtuse; *nostrils* double, nearly approximated, and nearer the eyes than to the rostrum; *eyes* moderately large, the pupils black, and the iris silvery; *teeth* none; *gill-covers* silvery, with a narrow membrane on the edges, and furnished at their superior part with a minute flat spine; *gill openings* ample; *body* four times the length of the head, cylindrical; *back* slightly arched, dark brown; *lateral line* straight, nearly obsolete; *pectorals* low, pointed; dorsal above the ventrals, trapezoidal, nearly straight on its margin; *caudal* furcated, lobes equal, with accessory rays; *scales* radiate, and very deciduous; *air bladder* divided into two cylindrical portions placed lengthwise, and connected by a small tube.

Length—Three to six inches.

Br. 4. P. 11. D. 8. V. 8. A. 8. C. 20½.

This delicate and beautiful fish is familiarly known under the name of *Spawn-eater*, in allusion to its supposed food. It may be remarked, however, that several fish of different species have the same appellation. We owe our knowledge of this species to *Mr. F. Cozens*, who presented an individual to the cabinet of the Lyceum several months ago. It is there labelled *Stolephorus Hudsonius*. N. Sp. As the genus *Stolephorus* of Lacépède has been suppressed by Cuvier, and incorporated with his sub-genus *Clupea*, we have arranged the *Spawn-eater* under that genus, not however without some doubts arising from the indistinct serrature of the abdomen.

NOTICE of a locality of YENITE in the United States. By
JOHN TORREY, M. D. Read Nov. 24, 1823.

A FEW days since, the Hon. Samuel Eddy, of Providence, Rhode Island, presented me an uncommon mineral for examination, with permission to publish my remarks, should the substance prove to be interesting.

It was found at Cumberland, in Rhode Island, in small crystals, imbedded in an aggregate of quartz and epidote. The crystals vary in size. The largest found by Mr. Eddy was an inch and a quarter in length, one quarter of an inch broad, and about two lines in thickness. The terminations are wanting. Its form is nearly rectangular; the surface striated and shining, with a semi-metallic lustre. Cross fracture somewhat resinous. It is imperfectly foliated in the direction of the longer diagonal of the prism. It scratches glass slightly. It is opaque, and of a blackish brown colour. The powder has the colour of the mass. Specific gravity 3.6.

Before the blow-pipe it melted with great ease into a black opaque glass, which was strongly attracted by the magnet.

Some crystals were found almost acicular, traversing the quartz in every direction.

From all these characters, I have no doubt the mineral is YENITE; a species which has not hitherto been known to exist in America. In justice, however, to my friend Professor Dewey, of Williams College, I must here state, that in a letter I lately received from him, he mentions having just examined a mineral from Connecticut, which he believes to be YENITE. A detailed account and analysis of this, will soon be forwarded to the Lyceum.

DESCRIPTION of a new species of SIREN, with some observations on animals of a similar nature. By Captain JOHN LE CONTE, of the U. S. Army. F. L. S. &c. Read Dec. 1, 1823.

AMONGST those animals whose mode of life removes them from our immediate view, it is natural to expect that more discoveries may be made than amongst those which are more frequently and more openly subjected to our examination. The class of amphibia, or reptiles, on this account, will in every country where nature has not been investigated by her admirers, offer more to our study and enterprise than any other. Such of them as inhabit on the surface of the earth are persecuted by the hand of prejudice with a severity that soon extirpates them, and those whose retiring habits lead them to the water as their proper habitation, are either so constantly immersed in the fluid that affords them support and protection, or so deeply buried in the earth which it covers, as in a great measure to elude the researches of even the most skilful naturalists. It is not therefore surprising that the animal to which I wish this evening to call the attention of the society, should have hitherto been undescribed. Its small size, its obscure colour, and the place of its residence, have all combined to render it unknown to former naturalists. If genera do exist in nature, we might reasonably calculate that they always consist of more than one species: therefore, in the country that produces the *Siren lacertina*, it was to be expected that other species might be found. It has been my fortune to determine this to be so, and it will be seen from the remarks which follow, that not the least good resulting from this discovery will be the elucidation of facts relative to the history of the *Siren lacertina*, hitherto so little understood, and the correction of some material errors in its physiology. A proper rank in the chain of organized beings may be given to various animals of a similar habit and nature, if the relation existing between them

be pointed out. Many that are now anomalous will no longer stand alone, but be collected into a group, as natural as any of the artificial divisions at present received by all.

I call our new animal the *Siren striata*.* (Pl. IV.)

Cabinet of the Lyceum.

Its length varies from seven to nine inches, of which from three to four inches are occupied by the tail ; legs two anterior, feet three-toed, without claws ; colour dusky, with a broad brown stripe on each side, and another rather paler one on each side of the belly ; beneath speckled with brownish white ; tail compressed, ancipital scarcely furnished with a fin, sides marked with transverse furrows imitating ribs ; spiracula three on each side, furnished with a fleshy trilobate covering ; the lobes entire and naked ; teeth none. The body is covered with a thick mucus like the *Siren lacertina*, but unlike that animal, it has no disagreeable smell. It inhabits in the mud of overflowed places in swamps, and does not burrow in the ground. It is but rarely met with, is perfectly mute, swims with tolerable agility in the water, but can make little if any progress on the ground ; and when once dried by exposure to the air, loses its life. An examination of the stomach has never afforded me any satisfaction with regard to its food ; and indeed in the *Siren lacertina* I have never found that organ to contain any thing but mud. The internal anatomy, as far as examined, presents nothing different from the other species.

It will be observed that the coverings of the spiracula in this are not fringed as in the *lacertina* ; they therefore cannot be used for the same purpose as those are said to be, that is to say, they do not perform the office of gills. In those animals that are furnished with spiracula as well as nostrils, we always find the former furnished on the edges with a contractile skin, by means of which those orifices are diminished or enlarged at will, whenever they are made use of. It is reasonable to conclude, that both species of *Siren* make use of these appendages for the same purpose. Under what circumstances, however, they are used, I am not prepared to say, as in the many

that have been under my observation, I never saw them in any position whilst in the water, where it could be imagined that they were used in breathing. They were generally extended and undulatory, as if to direct or accelerate the animal's progress through the water. When the *Siren lacertina* wishes to inspire, he rises to the surface; this is however scarcely three times in the course of twelve hours, and he expires under the water about once in two hours. I never saw the *Siren striata* expire any air: although they rise occasionally to the surface, it is impossible to observe whether they then inhale.

How apt are we to suffer ourselves, in our researches, to be drawn aside from certainty and truth by a foolish desire of accounting for every thing! Nature is covered with a thick veil, which cannot be penetrated: a proud spirit and an ambitious presumption may lead us to suppose that we have been enabled to remove the covering which she throws over her operations, but every day's experience shows us the absurdity of publishing our vague hypotheses for established truth, and the still greater absurdity of attempting to defend them. The *Siren lacertina* is not an inhabitant of the water, but rarely and only accidentally found in it, when it leaves its subterranean abode in the firm and moist clay. It would be difficult to say, therefore, of what use gills would be to it. The *Amphiuma*, (*Chrysodon* of others,) which in so many respects resembles it, and which inhabits the water, has naked spiracula; an animal that could use fringed coverings to them, if they were to be employed as gills, has them not; whilst another, to which they could be of little or no use for a similar purpose, is abundantly furnished with them.

The desire of grouping together animals in classes and orders, as if they were positively so placed by nature, rendered it necessary, in the minds of the older naturalists, to find something common to the genus *Siren*, and the cartilaginous fishes, which were then arranged among the amphibia. Hence the contradictory descriptions of this animal, and the assertion that it is furnished with external or internal gills.

In Pennant's Arctic Zoology I find the following description of the Siren. "Head and body anguilliform; eyes minute; nostrils placed in the side of the nose; teeth sharp, ranged in transverse rows; three openings to the gills, with three pinnated appendages on each side of the covers; legs in the form of arms, placed high on the breast and not remote from the head; each foot with four divided toes with a claw to each; body covered with small scales sunk in a gelatinous matter; colour dusky, sides dotted in lines with white; tail compressed and like that of an eel, furnished above and below with a rayless fin."

Linneus's description of the same animal is as follows: "A double series of teeth in each jaw; head like that of a lizard; body without scales, naked; four branchiæ are situated on each side, within a fleshy and trilobate operculum, that opens with a narrow aperture; the two lateral branchiæ connate with the aperture, the two intermediate ones free; two orders of acute cartilaginous tubercles surround the internal side of the branchial arches; toes, four on each foot, furnished with claws; tail compressed on each side, ancipital."

A comparison of these two descriptions with one made by myself from numerous specimens, all of which by examination were proven to be adult animals, and those of the female sex constantly full of spawn, will show that neither of these could be the *Siren lacertina*; so that the gentlemen who wrote them were strangely blinded and misled. S. legs before, four-toed, with small claws; body above black, beneath dusky speckled with yellowish; or above dusky, beneath paler, speckled every where with yellowish; eyes small, blueish; nostrils small, distant, placed as it were in the upper lip; jaws toothless, but furnished with a hard black skin extending in the lower jaw the whole width of the mouth, in the upper, but a short distance in front; roof of the mouth, with two large clusters of small teeth; spiracula three on each side, near the neck, linear, the interior edge serrate, with a fringed tri-

lobate covering; tail compressed, with a narrow rayless fin above and below.

In the description quoted from Pennant, the teeth are said to be in transverse rows, by which may be meant the clusters of teeth in the roof of the mouth; but then he says the body is covered with scales. Linnæus says there is a double row of teeth in each jaw, and the apparatus about the spiracula is so different from any thing in the Siren, that we must suppose he examined an animal now unknown to us; from the teeth, it might be thought that he had the *Amphiuma* before him; but this last, besides having four feet and wanting the fringed appendages to the neck, could, to one examining it anatomically, have presented this striking difference from the Siren: it has a bony and solid skull like that of a lizard, while the Siren (both species) has it composed of separate bones like a fish or a frog, herein approaching the *Proteus* more nearly than any other of the anomalous reptiles that have lately begun to engage the attention of naturalists. It is to be hoped that the question concerning the Siren, whether it be a perfect animal or not, will now be at rest; in both species there could be no doubt of the perfect state of the individuals which I had; the single circumstance of many of them containing spawn precisely similar to that of the frog, showed that they were perfect, and if no external difference between them and such as had no spawn was to be observed, the conclusion that these likewise were perfect, is equally as sound; besides, they may be seen of all sizes.

A few observations on two other animals of a similar nature to those already alluded to in this paper, I hope will not be considered inappropriate, and will, I trust, be received by the Society as an appendix to remarks somewhat crude, which a variety of other avocations has prevented me from making what it were to be wished they were, more perfect.

In the last number of Silliman's Journal, Professor Mitchill has described an animal, which he calls a *Proteus*, the vulgar name of which is Hell-bender. The name is nothing; it is

the reality and the knowledge of the animal at which we aim. The Hell-Bender of the Ohio (*sit venia verbo*) is a very different animal from the Professor's Proteus; it is every way larger, and more bulky in its appearance; has no branchial appendages to its spiracula, and has consequently without much violence been arranged with the Salamanders: it might more properly come next to the *Amphiuma*, or indeed is another species of that genus. It was called by the late Dr. Barton, who probably examined it before any one else, *Protonopsis*; it was afterwards carried to France by M. Michaux, and has been described by Sonini and Lattreille as a Salamander—(*Salamandre des Monts Alleghaniens*). The Proteus of the lakes may possibly be the larva of this animal; for most of the animals that inhabit the lakes are found in the western rivers. It seems much to resemble the *Axolotl* of Mexico, and the distance between the abode of these two does not prevent them from being the same, there being a great similarity between the natural productions of Mexico and the western states. But a very accurate description of the animal under consideration was published by Schneider, in the year 1799, in his *Historia Amphibiorum* fasc. 1. page 50. He observes that the specimen which he examined was said to have come from Lake Champlain, where it was caught along with fish, and reckoned poisonous by the fishermen. Body more than eight inches long, and nearly one inch in thickness, soft, spongy, pervious with many pores, with three rows of round spots on each side, varied with rows of black ones; tail compressed and ancipital, spotted on both sides, the inferior edge straight, the superior curved, terminating in a rather cylindrical end. Head broad and flat, eyes small, nostrils anterior, in the margin of the upper lip, a double row of teeth in the upper jaw, a single in the lower, conic, obtuse, longish; tongue broad, entire, free at the fore part, aperture of the mouth opening even to the vertical line of the eyes; lips like those of a fish; feet four cleft, four-toed, clawless; fissure of the anus opening longitudi-

nally. Three branchiæ on each side externally propendent, opposed to as many cartilaginous arches, the internal side of which is rough, and furnished with cartilaginous tubercles, as in fish. There is only a double branchial aperture on each side, for the upper and the lower arch of the branchiæ is adnate to the skin.

These animals, the two species of siren, the *Amphiuma*, the *Hell-Bender*, the *Axolotl*, the *Proteus*, with one or two others, perhaps obscurely and imperfectly described, will form a family of reptiles distinct from all others, by being furnished with nostrils and spiracula; they will naturally be divided into such as have a bony and solid skull, as the *Amphiuma* and *Hell-Bender*, and such as are composed of many separate bones, as the *Siren* and *Proteus*, for after all it is only anatomical examination that can point out the true connexion and difference between animals.

OBSERVATIONS on the teeth of the *MEGATHERIUM* recently discovered in the United States. By SAMUEL L. MITCHILL, M.D.
Read Nov. 17, 1823.

THROUGH the politeness of Mr. A. Taylor, I have received some fossil teeth from Skidaway Island (Georgia). Many bones were found with these teeth, but from the carelessness of the persons who discovered them, they are dispersed or destroyed. I can obtain no information as to their situation when discovered.

These teeth are very remarkable, and differ much from any hitherto discovered in North America. In my investigations I was assisted by my friend Dr. Dekay, and there can be no doubt that the teeth in question belong to that extinct species, denominated by Cuvier the *Megatherium*.

From the interesting nature of the subject (no specimen having heretofore been discovered of the *Megatherium* north of the Equator), it is presumed that a concise account

of this singular animal, accompanied with a description of the teeth, recently found at Skidaway Island, will not be unacceptable to our society.

The *Megatherium*, though in size larger than the Rhinoceros or the Elephant, has, until late years, been entirely unknown. Spain has, however, in her cabinets, the greater part of three skeletons. In the year 1789, the Marquis of Loretto, Viceroy of Buenos Ayres, sent to Spain the first and most perfect skeleton of the *Megatherium* (the one now in the cabinet of Madrid), stating that it was found in making some excavations on the banks of the Luxam, a league SE. of a city of the same name, being about three leagues W.S.W. of Buenos Ayres. In 1795, another specimen was received from Lenia, and a third is known as having been found at Paraguay.

These are all the known specimens that have been discovered ; and it appears, that although found in different parts of South America, they have hitherto been confined to that country.

There is however an animal whose bones are described by Mr. Jefferson, in the Philosophical Transactions for 1797, under the name of *Megalonix*, with characters somewhat similar. Cuvier considers it as a distinct species belonging to the same genus. It is much smaller, and is distinguished by other peculiarities, which serve to corroborate the correctness of the division. In nothing, perhaps, are the differences more remarkable, than in the form and structure of the teeth, which, in the *Megalonix*, are simple, cylindrical, superior or grinding surface depressed in the centre, with rising edges ; in the *Megatherium*, they are square, and offer a peculiar conformation of their superior surface, presently to be described.

For a particular anatomical description of the *Megatherium*, none better can be found than that by Cuvier, in his elaborate work on fossil bones, Vol. IV., from which we have drawn the foregoing history. It is sufficient to observe, that there are sixteen molar teeth, four on either side of each jaw, and that the animal has no canine or incisor tooth.

The form of the teeth, and the structure of the claw, lead to a belief that they subsisted on vegetables, and principally on roots, their claws appearing well adapted to this purpose.

They are placed by Cuvier among the Edentés, as occupying a place between the *Sloth* (*Bradypus* Lin.) and the *Ant Eater*, (*Myrmecophagus* Lin.) though much nearer to the former than the latter.

St. Fond, without attempting to invalidate the arguments of Cuvier, which led him to place the *Megatherium* in this family, conceives its great size to be incompatible with the habits of a Sloth or an Ant Eater; he proposes that it shall be laid aside until further investigations shall arrange it in its place, as he supposes that it is not sufficiently known to justify any present classification.

It has already been remarked, that these species have been found only in South America, where alone are found in living animals, the nearest resemblance to this extinct race.

"The teeth of the *Megatherium* are sixteen in number, each about two inches square, presenting rounded angles with a groove between, on the external and internal surface, and terminating where the fangs commence their separation; the root or fang gradually diminishing in size as it descends. Each tooth has four angles, two external and two internal; the upper surface has a depression separated by four points; the form or depression of the cavity being pyramidal, finishing a little the deepest in front. The exact weight of the four first teeth, is twenty ounces, that of the others, twenty-six ounces." Such is the description given by Mr. Bru, curator of the royal cabinet of Madrid, who arranged the first skeleton, and published an account of it in 1756.

Having thus given as concise a history of this animal as is consistent with the importance of the subject, I proceed to treat of the collection of teeth recently presented to me from Skidaway Island. It consists of one tooth entire, with the exception of the fang which is broken transversely off, and the half of another, with the fang separated in a similar manner.

The figure, Pl. VI. fig. 1. represents the former, and fig. 2. the latter. The tooth of the *Megalonix* is introduced at fig. 3. to exhibit the strong contrast between this animal and the *Megatherium*.

The figure of the entire tooth, fig. 1. is nearly square, the angles are rounded, and have a longitudinal groove between them on the external and internal surfaces; this groove is more strongly marked on the latter surface. The teeth are somewhat broader from side to side than in the direction of their anterior and posterior surfaces. The posterior or grinding surface will be better understood by a reference to the figure, than by the most elaborate description; the length of this tooth being five and a half inches, presents a singular and striking coincidence with what is stated above on this point by M. Bru.

The half tooth, fig. 2. corresponds in every particular with the anterior process of the entire one. The accidental fracture enables us to have an excellent view of the arborescent arrangement of the fibres, and exhibits, at the same time, the thickness and structure of the enamel; this is exhibited in the figure. The colour of the teeth is black; their cutting surfaces much worn, indicative of age.

Although, from the circumstances previously mentioned, it is hardly possible that a complete skeleton will be found, yet enough has been discovered to satisfy us, that the United States, which contains so many relics of huge animals, may add to her "giant brood," the *Megatherium*.

An ANALYTICAL TABLE to facilitate the determination of the hitherto observed North American Species of the Genus CAREX. By the Rev. LEWIS D. DE SCHWEINITZ. Read Dec. 8, 1823.

THE object of the annexed table is to enable botanists to ascertain readily if any American species of *Carex*, which they wish to determine, has been described or not. A prominent particular in each is selected for contrast, though it is scarcely necessary to state that other characters, of equal importance, are often omitted whenever a short antithesis was sufficient. In this table I have rejected those European species cited by Pursh as American, which stand as such upon his authority alone; it being evident that he did not critically compare the species of this genus. I refer to Pursh, however, as often as a species of my table is mentioned in his *Flora*, because further references are there found. I submit the following directions for its use.

In order to determine the specific name of any *Carex* according to this table, take a good complete specimen, or, if possible, a number of specimens, in order to prevent being misled by individual particularities, and compare them with Number 1. of the series of dichotomous antithetical positions, of which the table consists; it will not be difficult to ascertain to which of the two positions it answers. The number subjoined to this directs to the number of the continued series, to which it is then necessary to recur. Next examine again which of the antithetical positions in that number embraces the *Carex* under investigation, and the number annexed to that, again directs to some other pair of positions; and so on, until you arrive at that one to which the specific name is attached. It is always necessary to compare both positions in each number, because one serves to explain the other. Occasionally the final positions, which indicate the specific name, are made trichotomous for the sake of brevity, as it can never be diffi-

cult to compare three exclusive positions; and wherever there is ambiguity, care has been taken to indicate several coinciding distinctions. In a few instances, the table is so contrived as to lead to the same final result, by directing backwards, on account of an apprehended ambiguity, whichever way may have been chosen.

In case neither one nor the other of any two positions arrived at, embraces the specimens under examination, that circumstance proves, provided the examination has been correctly proceeded in, which a repetition will ascertain, that that *Carex* is not contained in the table. It must then be compared with the American species of authors, and if not found to belong to one of them, can be considered a new one. It is scarcely necessary to remark that the effect of the table can only be to enable the examiner to be next to certain, whether the *Carex* in question is in the table, and by what name the *author* designates it. The validity of the species can be ascertained only by comparison with full and detailed descriptions. On this account, references to Pursh's *Flora*, which again refers to more detailed descriptions, are subjoined to each specific name, if to be found in Pursh: if not, to the author that describes the species. The numbers annexed in this manner, "LS. No. 1." &c. refer to the descriptions of some new species proposed by the author of this table. A little practice will render the satisfactory result of the examination of any *Carex* almost necessary. Two or three subjoined examples will elucidate the manner of using the present table. Suppose you are examining a specimen of *Carex Squarrosa*, you will be necessarily directed one after the other to the following numbers:

Numbers 3. 4. 5. 6. - - - - - *Carex Squarrosa*.

On examining, *Carex tentaculata*, to the following:

Numbers 3. 48. 49. 50. 53. 54. 56. 57. 58. 59. 60. *C. tentaculata*.

On examining a specimen of *Carex acuta*, to the following:

Numbers 3. 48. 87. 88. 90. - - - - - *C. acuta*.

Determination of the North American Carices, hitherto known to Lewis D. de Schœnlinz.

<i>Positions.</i>	<i>Recur to No.</i>	<i>Specific names, references, &c.</i>
culms	2	
culms	3	
-	-	
-	-	
-	-	<i>C. sterilis</i> , Cherokee, Pursh n. 2.
-	-	† <i>C. Michauxii</i> , (Scleroides Mx.) Pursh n. 1.
-	4	
-	46	
-	5	
-	38	
-	6	
-	10	
-	7	
-	-	<i>C. squarrosa</i> , Willd. Sp. Pl. Carol. &c. n. 17.
-	8	
-	-	† <i>C. filifolia</i> , Nuttall n. 7.
-	-	† <i>C. Fraseri</i> , Pursh n. 27.
-	9	
culms summit very small in proportion	-	<i>C. Willdenowii</i> , Pursh n. 28. N. Oar.
culms proportionably long, attenuated	-	<i>C. polytrichoides</i> , Pursh n. 29. Pennsylv.
culm	-	<i>C. cephalophora</i> , Pursh n. 26. ubique.
-	11	
-	12	
-	25	
-	13	
-	28	

— 13.	a	Spikes regularly and similarly formed	.	.	.
— 14.	b	irregularly and variously formed	-	-	-
— 15.	a	Spikes more or less paniculate	-	-	-
— 16.	b	not paniculate	-	-	-
— 17.	a	Numerous conspicuous long bractæe among the spikes	-	-	-
— 18.	b	Without conspicuous bractæe	-	-	-
— 19.	a	Capsules in a more or less erect position	-	-	-
— 20.	b	Capsules quite erect; male summit deciduous	-	-	-
— 21.	a	somewhat diverging; male summit persistent	-	-	-
— 22.	b	Spikes small and few flowered	-	-	-
— 23.	a	of considerable size, and many flowered	-	-	-
— 24.	b	Spikes all approximate	-	-	-
— 25.	a	Some spikes more or less remote	-	-	-
— 26.	b	All the spikes remote from one another	-	-	-
— 27.	a	Upper spikes approximate	-	-	-
— 28.	b	Capsules roseaciously and horizontally diverging	-	-	-
— 29.	a	not horizontal, but subsessile	-	-	-
— 30.	b	Capsules terete, long-necked, smooth	-	-	-
— 31.	a	ovate, compressed, strongly margined	-	-	-
— 32.	b	Spikes corymbosely ramose	-	-	-
— 33.	a	not ramose	-	-	-
— 34.	b	Capsules not longer than the scales; spikes pendulous	-	-	-
— 35.	a	longer than the scales; spikes not pendulous	-	-	-
— 36.	b	Female florets with two stigmas	-	-	-
— 37.	a	three	-	-	-
— 38.	b	Spikes generally less than four in number	-	-	-
— 39.	a	more than four in number	-	-	-
— 40.	b	Spikes on short peduncles, cylindrically crowded	-	-	-
— 41.	a	sessile, not cylindrical and luscio	-	-	-
— 42.	b	Small subcylindrical spikes	-	-	-

Series of Antithetical Positions.		Recur to No.	Specific names, references, &c.
No. 28.	b Larger, not cylindrical spikes -	-	-
- 29.	a Capsules horizontal, or backward bent	-	-
-	b diverging, but not backward bent	-	-
-	c erect, of a distichous appearance	-	-
- 30.	a Spikes crowded into a pseudo-capitulum	-	-
-	b not thus crowded	-	-
- 31.	a Spikes attenuated above	-	-
-	b more or less obtuse above	-	-
- 32.	a More than six large spikelets crowded into a large spike	-	-
-	b Spikelets not exceeding six in number	-	-
- 33.	a Spikelets all crowded closely in the summit, thick	-	-
-	b subdistant from one another, slender	-	-
- 34.	a Lower spikelets arranged in a fascicle	-	-
-	b No fasciculate spikelets	-	-
- 35.	a Spikes almost globular, not more than four in number	-	-
-	b not globular, more than four in number	-	-
- 36.	a Spikelets eight to twenty in number	-	-
-	b less than eight in number	-	-
- 37.	a Numerous male florets at base, rendering the spikelets clavate	-	-
-	b Few male florets at base	-	-
- 38.	a The androgynous spike male in summit	-	-
-	b sometimes male, sometimes female in summit	-	-
-	c female in summit	-	-
- 39.	a Thick squarrose spikes, capsules long, rostrate	-	-
-	b Slender not squarrose spikes, capsules not long, rostrate	-	-
- 40.	a All the spikes sessile	-	-
-	b Some spikes pedunculate	-	-

Recur to No.	Specific names, references, &c.
30	<i>C. stellulata</i> , Willd. (retroflexa multorum.) <i>C. Scirpoides</i> , Pursh. Ubique. <i>C. curta</i> , Pursh. New Eng. <i>C. cristata</i> , L. S. N. Jersey.
31	-
32	-
34	<i>C. Muskingumensis</i> , L. S. Ohio.
38	<i>C. ovalis</i> , Pursh, (<i>C. scoparia</i> Mhl.) Ubique. <i>C. albulotensis</i> , L. S. Carol. and Pennsylv. <i>C. foenea</i> , Muhl. Gr. No. 14. Carol. [Schkuhr f. 34.]
35	<i>C. straminea</i> , Schk. f. 174. not Muhl. nor
36	<i>C. lagopodioides</i> , Pursh. Ubique.
37	<i>C. festuacea</i> , Pursh. Ubique. <i>C. scoparia</i> , (straminea Mhl. and Schkuhr f. 34.) <i>C. floridana</i> , L. S. Le Conte Florida. <i>C. irregularis</i> , L. S. N. Jersey.
39	<i>C. typhnoides</i> , L. S. N. Carol.
40	<i>C. viridula</i> , Michx. Carol.
41	-

— 42.	a Capsules glabrous - - - - -	43
—	b ——— pubescent - - - - -	45
— 43.	a Leaves glabrous - - - - -	44
—	b ——— pubescent - - - - -	
— 44.	a Female scales dark purple, margined	
—	b ——— brown, not conspicuously margined	
— 45.	a Outer sheaths purple, capsules strongly costate -	
—	b ——— not purple, capsules not strongly costate	
— 46.	a Male spike solitary - - - - -	47
—	b ——— more than one - - - - -	93
— 47.	a Female spikes sessile, or on included peduncles	48
—	b ——— on long exserted peduncles	67
— 48.	a Female florets with two stigmas	49
—	b ——— three stigmas	52
— 49.	a One female spike only: capsules fasciculate on the rachis -	
—	b Several female spikes of a regular form - - - - -	50
— 50.	a Scales of the spikes more or less blackish, spikes subpedunculate	51
—	b Scales green: spikes sessile, subdistant - - - - -	
— 51.	a Male spike large and blackish, broad and obtuse; female spikes obtuse	
—	b Male spike small, brown, attenuate either way; fem. likewise atten.	
— 52.	a Scales and capsules blackish - - - - -	53
—	b ——— not blackish - - - - -	
— 53.	a Capsules more or less subulate, somewhat distichously arranged on the rachis - - - - -	54
—	b Capsules not subulate, nor so arranged - - - - -	55
— 54.	a Reostium bifid tenaciously hooked back - - - - -	
—	b ——— straight, widely recurved, capsule subventricose -	
— 55.	a ——— gibbous, scarcely open, capsules ventricose, very striate	56
—	b Capsules glabrous - - - - -	
—	c ——— pubescent - - - - -	60
— 56.	a Mature capsules small, in a reflexed position - - - - -	

C. hirsuta, Pursh. Carol.*C. Buchanani*, Pursh. Pennsylvania.*C. caroliniana*, L. S. Carol.*C. costata*, L. S. Pennsylv. An varieties sequentis?*C. virescens*, Pursh. N. States.*C. Jessoii*, L. S. Indiana.*C. novae angliae*, L. S. New-England.† *C. saxatilis*, Pursh? Probably the following.*C. Bigelovii*, Torrey. Very near *saxatilis*. White*C. nigra*, Willd. Labrador.*C. Collinsii*, Nutt. N. Jersey.*C. subulata*, Mx. On Alleghany Mountains.*C. striata*, L. S. Fayette, N. Car. An xantho-[*physa quorundorum*?*C. flosa*, Pursh. Massachusetts.

Series of Antithetical Positions.		Recur to No.	Specific names, references, &c.
No. 55.	b Mature capsules very large, not in a reflexed position	57	<i>C. folliculata</i> , Pursh. Carol. N. States.
— 57.	a Female spikes one, subsessile, capsules few, rosaceously diverging	58	
— 58.	b several, capsules numerous, not in that position	59	[<i>ricina</i> Schkr. <i>C. tentaculata</i> , P. rostrata. variet. etiam hyste- <i>C. lupulina</i> , P. Ubique. <i>C. xanthophylla</i> , Mhl. Wahl. N. Jersey & Carol. <i>C. pubescens</i> , P. Northern States.
— 59.	a Female spikes thick, short, suberect	61	<i>C. alpestris</i> , Willd. Dewey. Massachusetts.
— 60.	b long, cylindrical, squarrose, finally subpendulous	62	
— 61.	a Female spikes close together, and with the male	63	<i>C. nigromarginata</i> , L. S. Carol.
— 62.	b distant, male on a long peduncle	64	
— 63.	a Leaves and culm pubescent	65	<i>C. vestita</i> , Pursh.
— 64.	b glabrous	66	
— 65.	a Lower female spike on a long radical peduncle	67	<i>C. stolonifera</i> , L. S. An militaris? Pennsylvania. <i>C. marginata</i> , P. Ubique.
— 66.	b not thus situated	68	<i>C. dasycarpa</i> , Mhl. Carolin. <i>C. varia</i> , Pursh. Ubique.
— 67.	a Spikes of both sexes sessile, aggregated in a terminal capitulum on peduncle formed culms	69	
— 68.	b Male spikes more or less peduncled; culm not thus formed	70	
— 69.	a Male spike conspicuously pedunculate		
— 70.	b very little pedunculate		
— 71.	a Short obliquely bent rostrum		
— 72.	b straight bifid rostrum		
— 73.	a Culms low, squarrose, stolons, male spike broad black purple		
— 74.	b tall, without stolons, subtrigonal light coloured male spike		
— 75.	a Stigmas longer than female spikes, entwining them		
— 76.	b of common size		
— 77.	a Spikes from short but conspicuous sheaths		
— 78.	b Sheaths wanting or obliterated		
— 79.	a Lower female spikes on a long exerted peduncle		
— 80.	b All female spikes on lengthening exerted peduncles		
— 81.	a Capsules more or less subulate, somewhat distichously arranged on the rachis		
— 82.	b Capsules not subulate, or so arranged		

Series of Antithetical Positions.		Recur- to No.	Specific name, references, &c.
No. 83.	b Common leaves not glaucous	85	
84.	a Leaves and culms decumbent, culmous leaves broad short, female spikes very distant from one another		
	b Culm and leaves strictly erect, spikes pendulous, on increasing filiform peduncles		<i>C. laxiculmis</i> , L. S. Carol.
85.	a Capsules on a long flexuose rachis, very distant		<i>C. littoralis</i> , L. S. Cape May, an <i>C. panicea</i> ?
	b _____ closely arranged on the rachis		<i>C. flexuosa</i> , Pursh.
86.	a Spikes cylindrical, capsules very obtuse	86	<i>C. digitalis</i> , Pursh.
	b _____ ovate short, capsules leucicular, strongly costate		<i>C. lenticularis</i> , Michx. Massachusetts.
	c _____ black, capsules strongly compressed, acuminate		<i>C. ustulata</i> , Willd. Labrador.
87.	a Female spikes with long rostrate reflexed capsules	88	
	b _____ with capsules not long rostrate or deflexed	89	
88.	a Long peduncled pendulous spikes		<i>C. pseudocyperus</i> , Pursh, Mbl.
	b Short peduncled not pendulous spikes		<i>C. hystericina</i> , Pursh. N. States.
89.	a Culms tall, spikes on more or less long peduncles	90	
	b _____ low, spikes on short peduncles	92	
90.	a Spikes subpendulous, leaves annual	91	
	b _____ suberect, leaves sempervirent		<i>C. temperirens</i> , L. S. Hillsborough. N. Carol.
91.	a Spikes long, cylindrical, capsules ovate, not nerved		<i>C. mitacea</i> , Pursh. Ubique.
	b _____ short ovate, capsules oblong, obtuse		<i>C. pallescens</i> , Willd. Massachusetts.
92.	a Spikes subumbellate, culm much shorter than the leaves		<i>C. umbellata</i> , Pursh. Massachusetts.
	b _____ not umbellate, culm equalling leaves		<i>C. aurea</i> , Nutt. N. Eng.
93.	a Female florets with two stigmas	94	
	b _____ with three stigmas	98	
94.	a Females spikes pendulous	95	
	b _____ erect	96	
95.	a Female scales prominent like bristles		<i>C. crinita</i> , Pursh. Ubique.
	b _____ not so prominent		<i>C. gynandra</i> , L. S. Carol.
96.	a Male spike generally solitary	97	

OBSERVATIONS on the North American Species of the Genus
UTRICULARIA. By Capt. JOHN LE CONTE, of the U. S.
Army, F. L. S., &c. Read January 5, 1824.

FROM an attentive examination and comparison of the different individuals forming any particular genus, many facts of importance may be educed, that we would not otherwise arrive at. This minute and patient investigation alone can disentangle the infinitely diversified forms of nature, that are so closely interlaced, and that run so imperceptibly into each other; while the want of it introduces confusion and disorder into all our attempts at their enumeration.

The genus *Utricularia*, although far from being numerous in species, yet from the want of proper attention, has been hitherto but imperfectly known. I have collected into this summary sketch all that at present can be found respecting it, as far as relates to the species of this country. My chief aim has been, to point out the real and proper differences between these species; to separate what is certain from what is doubtful; and above all, to correct the errors of our botanists with regard to some, which have been confounded with plants but little resembling them, in other parts of the world. I am conscious of differing in many things from even our latest writers; but that method of close and accurate reasoning which should be resorted to in all our pursuits after truth, has led me to the conclusions which I have drawn.

All the species of *Utricularia* in this country are emphatically water plants; that is to say, they all inhabit either water, or places that are generally inundated. With the exception of two or three, their roots (or leaves, as they have been called by some) are long, branching, and capillary, more or less furnished with utriculi or air bladders, by means of which they float on or near the surface of the water. They may be divided into three sections: 1st, such as only can ex-

ist in a floating position; 2d, such to which this position is equally as natural, but which, when the water recedes from them, lose their long, branching, and bladder-bearing roots, and become attached to the earth by shorter and naked ones, that penetrate the surface in the manner usual to other plants; and 3d, such as are always rooted in the earth. The stems of these last are furnished with a few remote scales, and if we find these scales attached to the stem of any floating species, we may be certain that it can flourish equally as well in the wet ground as in the water, whilst those with naked stems cannot exist except in water of some depth.

The generic characters I omit; they may be found in any botanical work: and proceed to the enumeration of the different species that have fallen under my observation.

1. *Utricularia ceratophylla*. Leaves inflated, 6-verticillated, floating, furnished on the sides with branching capillary filaments; flowers large, yellow, subcorymbose; the upper lip of the corolla rather trilobate, the lower deeply trilobate; spur short, conoidal flattened (*conoideo-complanatum*) obtuse, deeply emarginate, appressed to the lower lip of the corolla; fruit cernuous; root very long, branching, with numerous capillary radicles furnished with utriculi; stem eight inches in height. Plate VI. fig. 1.

A variety is found, in all its parts smaller, the stem scarcely an inch in height. Inhabits from New-York to Mexico. ♂

Of this species there is no doubt; it has been called *inflata*, but there being no reason for changing a name already adopted, I have retained that given to it by Michaux. It is the only species in North America, that has real leaves; the next has something that may be so called, but they differ materially in their form and position from what are found in this, and are really roots.

2. *U. macrorhiza*. Leafless, floating; scape about ten inches high, many flowered, furnished with large scales; flowers large, racemed, yellow; upper lip of the corolla subtrilo-

bate, lower lip entire, with the sides deflected; palate large, striped with brown; spur long, stretched out (*porrectum*), approaching the lower lip of the corolla, obtuse, emarginate, conic at the base, linear at the tip, fruit cernuous; root repent, very long, very branching, decompound, the first radicles naked, the rest furnished with utriculi. At the base of the stem, and shooting out in an opposite direction to the branches of the root, there is observed an imbricate ovate bud (*turio*), which contains the embryo of the next year's growth; and this circumstance would go far in proving that the radicles should be rather called leaves, did we not find that the utriculi are placed on them in the same manner as they are in other species, upon what are undeniably roots; and it would not be very reasonable to suppose that the plant had no root at all. Inhabits from Canada to Carolina. *U* Plate VI. fig. 2.

This is the species that in all the books is called *U. vulgaris*, and positively stated to be the same with the European. But a comparison of the two will show, that no stretch of the imagination can find any resemblance between them, farther than what is seen running through the whole genus. Roemer and Schultes describe the *U. vulgaris* as follows: peduncle scapiform, 4 to 8-flowered, racemed, furnished with scales; upper lip of the corolla ovate-rounded, subtrilobate, subundulate, with an erect margin; lower lip roundish, reflected at the sides, subplicate; palate bilobate, with orange-coloured striæ; spur conic, reflected from the lower lip. Plate VI. fig. 3.

It appears from this description, in the first place, that the *U. vulgaris* has not the fruit cernuous; and secondly, that the spur is short, conic, bent down, and not approaching the lower lip of the corolla, and entire at the tip, precisely similar to what our species would have, were the upper part cut off, and the lower and inflected part bent down; besides, in the representations given in botanical works, the root

does not resemble that of the *U. macrorhiza*; but is branching, the branches short, and furnished every where with utriculi. I may perhaps be told, that specimens have been sent to Europe, and pronounced identical with what they have there; but how impossible is it to compare accurately a tender and delicate plant, that has been pressed and dried for months or years, with another, and then to speak with certainty of differences which at best we must expect to find minute? This dependence upon dried specimens, and the neglect of living plants are the fruitful sources of all the errors with which our botany abounds.

I have little doubt, but that the *U. macrorhiza* will in time be found to be the same with the *U. foliosa* of South America. A figure of this last is found in Plumier Spec. fasc. 6. Icon. 165. fig. 2.; but no certain conclusions can be drawn from an inspection of it, as the author himself observes, "the parts of the flowers and of the fructification are rudely and imperfectly delineated." The description of this species, as far as can be collected is this: root repent, radicles without utriculi; scape many-flowered; spur conic acute, (represented in the plate as linear,) as long as the lower lip of the corolla, and appressed to it; fruit cernuous; said to be very like the *U. vulgaris*.

3. *U. striata*. Leafless floating, scape about ten inches high, furnished with one or two scales, 5 or 6-flowered; flowers large, yellow, upper lip of the corolla ample, expanded, trilobate, the intermediate lobe striate; lower lip subtrilobate, the sides reflected; palate dotted with brown; spur nearly linear, stretched out (*porrectum*) obtuse, emarginate, appressed to the lip of the corolla, and nearly equalling it in length; root very branching, furnished with utriculi. Inhabits from New-York to Florida. ☉ Plate VI. fig. 4.

This is the species that Pursh considered the *cornuta* of Michaux, for I was with him when he first saw it; the description in his book, however, does not suit, it being entirely copied

from Michaux; the *U. cornuta* he never saw. It is undoubtedly the *U. fibrosa* of Elliott, but probably not of Walter, as he could not have overlooked the length of the spur; it may likewise be the *U. biflora* of Vahl.

4. *U. gibba*. Leafless, floating, scape naked, 4 to 7-flowered; flowers small, yellow; upper lip of the corolla emarginate, lower subtrilobate, the intermediate lobe subrevolute, crenate; spur gibbous, incurved, obtuse, most entire; root repent, furnished with utriculi, and producing buds (*turiones*) like No. 2. Inhabits New-Jersey. 24 Plate VI. fig. 5.

5. *U. fornicata*. Leafless, floating; scape naked, 1 to 2-flowered; flowers yellow, upper lip of the corolla trilobate, the intermediate lobe arched over the palate, the lateral ones appressed, lower lip entire; spur incurved, conoidal, obtuse, most entire, appressed to the lower lip of the corolla; root furnished with utriculi. Inhabits from New-York to Georgia. ☉ Plate VI. fig. 6.

This is the *U. minor* of our American botanists, but it has no resemblance to the European plant, except in the smallness of the flowers. The *U. minor* has either no palate, or a very small one, the corolla is said to have "*faux aperta*;" whilst the *U. fornicata* has a rather large palate: it is likewise the *U. gibba* of Elliott, as appears from his description, and the particular locality assigned by him; it may be what Walter intended by the *U. pumila*.

6. *U. longirostris*. Leafless, floating, scape furnished with scales, 1 or 2-flowered; flowers yellow; upper lip of the corolla subtrilobate, the lateral lobes appressed, lower lip rather entire, spur linearly subulate, ascending, subincurved, emarginate, longer than the lower lip of the corolla; root furnished with utriculi. Inhabits Georgia. ☉ Plate VI. fig. 7.

This species agrees in some respects with Lamarck's *U. biflora*, but that must have been altogether a larger plant.

7. *U. integra*. Leafless, floating, scape furnished with scales, 1 or 2-flowered; flowers yellow; upper lip of the co-

— 42.	a Capsules glabrous - - - - -	43
—	b ——— pubescent - - - - -	45
— 43.	a Leaves glabrous - - - - -	44
—	b ——— pubescent - - - - -	
— 44.	a Female scales dark purple, margined	
—	b ——— brown, not conspicuously margined	
— 45.	a Outer sheaths purple, capsules strongly costate -	
—	b ——— not purple, capsules not strongly costate	
— 46.	a Male spike solitary - - - - -	47
—	b ——— more than one - - - - -	93
— 47.	a Female spikes sessile, or on included peduncles	48
—	b ——— on long exserted peduncles	67
— 48.	a Female florets with two stigmas - - - - -	49
—	b ——— three stigmas - - - - -	52
— 49.	a One female spike only: capsules fasciculate on the rachis -	
—	b Several female spikes of a regular form - - - - -	50
— 50.	a Scales of the spikes more or less blackish, spikes subpedunculate	51
—	b Scales green: spikes sessile, subdistant - - - - -	
— 51.	a Male spike large and blackish, broad and obtuse; female spikes obtuse	
—	b Male spike small, brown, attenuate either way; fem. likewise atten.	
— 52.	a Scales and capsules blackish - - - - -	
—	b ——— not blackish - - - - -	53
— 53.	a Capsules more or less subulate, somewhat distichously arranged on the rachis - - - - -	54
—	b Capsules not subulate, nor so arranged - - - - -	55
— 54.	a Rostrum bifid tenaciously hooked back - - - - -	
—	b ——— straight, widely recurved, capsule subventricose - -	
— 55.	a ——— gibbous, scarcely open, capsules ventricose, very striate	56
—	b Capsules glabrous - - - - -	60
—	b ——— pubescent - - - - -	
— 56.	a Mature capsules small, in a reflexed position - - - - -	

C. hirsuta, Pursh. Carol.*C. Barbomii*, Pursh. Pennsylvania.*C. caroliniana*, L. S. Carol.*C. cordata*, L. S. Pennysl. An varietas sequentis?*C. virescens*, Pursh. N. States.*C. Jamesii*, L. S. Indiana.*C. novae angliae*, L. S. New-England.† *C. acutistia*, Pursh? Probably the following.*C. Bigelowii*, Torrey. Very near *saxatilis*. White*C. nigra*, Willd. Labrador. [Hills.*C. Collinsii*, Nutt. N. Jersey.*C. subulata*, Mx. On Alleghany Mountains.*C. striata*, L. S. Fayette. N. Car. An xantho-[*physa quorundorum*?*C. flexa*, Pursh. Massachusetts.

Series of Antithetical Positions.		Recur to No.	Specific names, references, &c.
No. 56.	b Mature capsules very large, not in a reflexed position	57	<i>C. folliculata</i> , Pursh. Carol. N. States.
— 57.	a Female spikes one, sessile, capsules few, rosaceously diverging	58	
— 58.	b ——— several, capsules numerous, not in that position	59	<i>C. tentaculata</i> , P. rostrata. variet. etiam hyste- [ricina Schkr. <i>C. lupulina</i> , P. Ubiq.
— 59.	a Female spikes thick, short, suberect		<i>C. xanthophylla</i> , Mhl. Wahl. N. Jersey & Carol.
— 60.	b ——— long, cylindrical, squarrose, finally subpendulous		<i>C. pubescens</i> , P. Northern States.
— 61.	a Female spikes close together, and with the male	61	
— 62.	b ——— distant, male on a long peduncle	62	<i>C. alpestris</i> , Willd. Dewey. Massachusetts.
— 63.	a Leaves and culm pubescent		
— 64.	b ——— glabrous		
— 65.	a Lower female spike on a long radical peduncle		
— 66.	b ——— not thus situated		
— 67.	a Spikes of both sexes sessile, aggregated in a terminal capitulum on peduncle formed culms	63	<i>C. nigromarginata</i> , L. S. Carol.
— 68.	b Male spikes more or less peduncled; culm not thus formed	64	
— 69.	a Male spike conspicuously pedunculate	66	
— 70.	b ——— very little pedunculate	65	<i>C. vestita</i> , Pursh.
— 71.	a Short obliquely bent rostrum		
— 72.	b ——— straight bifid rostrum		
— 73.	a Culms low, squarrose, stolons, male spike broad black purple		<i>C. stolonifera</i> , L. S. An. militaris? Pennsylvania.
— 74.	b ——— tall, without stolons, subtrigonal light coloured male spike		<i>C. marginata</i> , P. Ubiq.
— 75.	a Stigmas longer than female spikes, entwining them		<i>C. distyca</i> , Mhl. Carolin.
— 76.	b ——— of common size		<i>C. varia</i> , Pursh. Ubiq.
— 77.	a Spikes from short but conspicuous sheaths	68	
— 78.	b Sheaths wanting or obliterated	87	
— 79.	a Lower female spikes on a long exserted peduncle	69	
— 80.	b All female spikes on lengthening exsert peduncles	83	
— 81.	a Capsules more or less subulate, somewhat distichously arranged on the rachis	54	
— 82.	b Capsules not subulate, or so arranged	70	

Series of Anthetical Positions.		Recur to No.	Specific name, references, &c.
No. 83.	b Common leaves not glaucous	85	
84.	a Leaves and culms decumbent, culmous leaves broad short, female spikes very distant from one another		<i>C. loriculata</i> , L. S. Carol.
	b Culm and leaves strictly erect, spikes pendulous, on increasing fil- form peduncles		<i>C. littoralis</i> , L. S. Cape May, an <i>C. panicea</i> ? <i>C. flexuosa</i> , Pursh.
85.	a Capsules on a long flexuose rachis, very distant	86	
	b ——— closely arranged on the rachis		<i>C. digitalis</i> , Pursh.
86.	a Spikes cylindrical, capsules very obtuse		<i>C. fenticularis</i> , Michx. Massachusetts.
	b ——— ovate short, capsules lenticular, strongly costate		<i>C. utulata</i> , Willd., Labrador.
	c ——— black, capsules strongly compressed, acuminate	88	
87.	a Female spikes with long rostrate reflexed capsules		
	b ——— with capsules not long rostrate or deflexed	89	
88.	a Long peduncled pendulous spikes		<i>C. pseudocyperus</i> , Pursh, Mhl.
	b Short peduncled not pendulous spikes		<i>C. hystericina</i> , Pursh. N. States.
89.	a Culms tall, spikes on more or less long peduncles	90	
	b ——— low, spikes on short peduncles	92	
90.	a Spikes subpendulous, leaves annual	91	
	b ——— suberect, leaves sempervirent		<i>C. temperirens</i> , L. S. Hillsborough. N. Carol.
91.	a Spikes long, cylindrical, capsules ovate, not nerved		<i>C. miliacea</i> , Pursh. Ubique.
	b ——— short ovate, capsules oblong, obtuse		<i>C. pallescens</i> , Willd. Massachusetts.
92.	a Spikes subumbellate, culm much shorter than the leaves		<i>C. umbellata</i> , Pursh. Massachusetts.
	b ——— not umbellate, culm equalling leaves		<i>C. aurea</i> , Nutt. N. Eng.
93.	a Female florets with two stigmas	94	
	b ——— with three stigmas	98	
94.	a Females spikes pendulous	95	
	b ——— erect	96	
95.	a Female scales prominent like bristles		<i>C. crinita</i> , Pursh. Ubique.
	b ——— not so prominent		<i>C. gynandra</i> , L. S. Carol.
96.	a Male spike generally solitary	97	

DESCRIPTION of an extraordinary Fish, resembling the *STYLEPHORUS* of Shaw. By S. L. MITCHILL, M.D. Read February 3, 1824.

THIS individual was presented to me by Captain Hector Coffin. It was taken during a voyage from Londonderry to New-York, in latitude 52° N. and longitude 30° W. It was discovered afloat about twenty yards from the vessel. A boat was hoisted out for the purpose of raising it. The creature was raised from the water without any resistance, and died in fifteen minutes after being brought on board.

When first seen, the belly was distended, as if blown up to the size of a quart decanter, or the crown of a hat. The stomach contained a fish ten inches long, which, from its sound state, appeared to have been recently swallowed. That fish was not preserved.

The length was six feet; of which fourteen inches belonged to the body, or the space between the extremity of the upper lip beneath to the vent. The tail was flagelliform, or like the lash of a whip, and gradually tapered away in the course of fifty-eight inches to a point. Toward the end it was flexible enough to be tied into knots, after the manner of a string or a cord.

The specimen was a female; and the colour a dusky brown, resembling that of a dark eel.

Its aspect, when raised from the jar of alcoholic spirit, in which it had been well preserved, was so strange and ambiguous, that, until I discovered gills, I could not satisfactorily decide that it was a fish. The roes were very distinct, the ovaries being large and full of eggs.

The pisciform character being settled, I endeavoured to determine the order to which it systematically belonged. Though the absence of ventral fins led to its classification among the Apodes, yet the want of opercles and branchial apertures, to-

gether with the presence of one slit on each side of the neck below for respiration, and a universal softness of the parts, fix its place among the *Cartilaginous*.

I proceed to a more particular description of its figure and dimensions.

The mouth had an enormous gape ; and the throat, for the space of six inches, was but a membranous bag. It was capacious enough to receive my hand without difficulty. The internal surface was black. There was no appearance of a tongue.

From the upper part of the mouth, or the spot where the upper maxillary bones unite, to the angle of the jaw, was three inches ; and from that angle to the tip of the lower jaw, three inches.

The symphysis of the chin had a very flexible joint, that was capable of opening or expanding from a most acute angle to a right line, or as nearly so as the curvature of the bones permitted. This construction, with a corresponding laxity of the jaws gave the mouth an extraordinary power of expansion. Yet, when the angles of the jaws are approximated, and the bones of the lower jaw brought to their parallelism, the mouth closes with exactness, and in that state gives no indication of the size to which it spreads when open.

The lower jaw was toothless ; but the upper jaw, for about an inch and a half, was furnished with a row of teeth, bony and hooked.

The eyes were situated about half an inch from the point of the upper jaw, one on each side, and looking forward. They were small, and did not exceed in diameter the sixteenth of an inch.

The head was smaller than is usual in fish. It would seem that its principal use was to give origin and insertion to the bones and muscles of the jaws. At its foremost point is a small knob or projection forward of the eyes ; and from it proceeded a sort of frænum sustaining the upper lip. From

this inconsiderable head proceeded the vertebral column, which in its progress to the tail gradually tapered away, and seemed to lose its bones and joints, and to be converted into a sort of tough and grisly appendage.

There was no appearance of ribs.

There were two gill-openings, one on each side of the neck below, resembling slits, about an inch and a half long. The gills themselves are situated within the duplicatures of the openings in three bundles or divisions, suspended by membranes and skin.

The skin was smooth and scaleless, and susceptible of being easily moved and pinched up, like that of some species of *Lophius*.

From the head a whitish line extended on each side of the back, as far as its bony constitution could be traced. Two similar stripes, one on each side, proceed from the vent backward to the tail, but they are less distinct, and disappeared sooner. Between the former is situated the dorsal fin; between the latter, the anal fin.

The dorsal fin begins about eleven inches from the tip of the upper jaw, and reaches like a fillet or narrow riband, quite to the tail, and at its extremity joined the anal.

The anal fin commenced just behind the vent, and was continued also quite to the tail, and there joined the dorsal.

The caudal fin was so faint or indistinct, that I have hardly thought it worthy of notice. I ought to remark, however, that several hair-like rays may be distinguished. The rays of these were very numerous, but it was impossible to count them.

Thus the dorsal and anal fins are united with each other, or are connected with the caudal.

The pectoral fins are situated immediately behind the gill openings. They are very small and feeble, of a squarish shape, and from one half to one quarter of an inch long.

They were of a fleshy consistence, and contained about thirty slender rays.

The distance from the mouth to the vent was fourteen inches. All the rest of the length, amounting to fifty-eight inches, tapered away gradually from an inch in depth almost to a point.

The stomach was ample and capacious; the intestine direct and short; the liver distinct and well-formed.

Filiform processes, or excrescences, about an inch in length, depended on each side of the whitish stripe all the way from the head down the back to the tail. The space between them is nearly an inch, so that they probably amounted to fifty pairs. These cirrhi, or threads, have no expansion or enlargement at their extremities.

The points of resemblance between this animal and the *Stylephorus* described by Shaw, may be easily gathered even from his bad description and worse figure. They are both furnished with the same curiously organized mouth, the same fins and elongated caudal process. The lateral line described above corresponds with the "double fibre" of Shaw, and they are both scaleless. In the *Stylephorus* the dorsal is described as not being continuous. He says, however, "I am not without my doubts whether it might not in the living animal have run quite to the tail, and whether the specimen might not have received injury in that part."

The colour of Shaw's fish is described as silvery; but those who are acquainted with the fugacious nature of metallic colours in this class of animals, are aware that nothing positive can be deduced from this accidental circumstance. The fact of their being captured in different latitudes, and the difference in their size, is of little importance.

The eyes of the *Stylephorus* are described as being large and pedunculated; in the animal noticed above, they are small and sessile. Shaw examines carefully to find marks of a reticulated structure, but without success. The circumstance of

their standing on peduncles or footstalks is so much at variance with what occurs in other animals, that I should hesitate little in declaring their unusual form to have been the result of accident or disease.

As the generic name proposed by Shaw is probably derived from an accidental character, I venture to substitute for it the name of *Saccopharynx*, in allusion to the pouch-like form of its throat.

GENUS. SACCOPHARYNX.

Jaws capable of great dilatation.

Throat wide like a bag.

Tail flagelliform, tapering away to a point, and beset with many pairs of cirrhi.

Dorsal, caudal, and anal fins united.

Cabinet of Dr. Mitchill.

OBSERVATIONS and Experiments on the Seeds of the CERBERA THEVETIA. By I. B. RICORD MADIANNA, M. D.
Read March 1, 1824.

PERSOON, in his *Synopsis Plantarum*, enumerates seven species of the genus *Cerbera*; and the only one which, until the present time, has been suspected of having deleterious properties, is the *Cerbera Ahovai*. Orfila, in his *Toxicologia*, mentions that the kernel of the fruit of *C. Ahovai* is very poisonous, and that the wood thrown into a pond stupifies the fish. He adds, that the fruit of *C. Manghas* has a sharp and bitter taste, and that its qualities are emetic. But this learned toxicologist makes no observations on the other species of *Cerbera*.

In October 1823, being at Guadaloupe, in the parish of Capes terre, I discovered the *C. Thevetia*. This shrub was

then (as is common in those climates) in full bearing, loaded with blossoms and fruits, both ripe and unripe. I gave some of the milky juice to a lizard, and being frequently in the habit of examining poisonous plants, immediately discovered that it was not deleterious.

I gathered about an ounce of the milky juice, and gave it to a young dog, which did not appear to be much incommoded by it. I gave the pulp of three of the fruits to another dog, which experienced no bad effect from it. Being much occupied at this time, in making experiments with other noxious plants, I determined to try the seeds of the *C. Thevetia* on some future occasion.

I re-commenced these experiments a few days ago in this city. Having pounded in a mortar the kernels found in one of the *C. Thevetia*, weighing 14 grains, I made an emulsion with distilled water. This emulsion had a bitter and soapy taste. At twenty-five minutes past ten o'clock in the morning, I gave this dose to a robust young dog, fasting. For about a minute, he made considerable exertions to vomit, having a dry cough, as if he had swallowed some substance, which was carried directly to the lungs. This continued until eleven o'clock, when the animal vomited at several different times, a whitish frothy matter; he foamed at the mouth in a manner similar to what I have observed when I have exhibited the seeds of the *Mammea americana*. He was much agitated, and ran about in different directions; his brain was affected, his mouth was covered with foam, and his posterior extremities stiff, accompanied by a staggering motion. At twenty minutes after eleven, there was great irritation of the stomach, and frequent inclination to vomit. At twelve o'clock, these symptoms were much abated. His respiration was agitated; but I judged, from previous experience in these cases, that the animal would recover. At three o'clock he was out of danger, as the dose had been too small to produce fatal consequences.

At thirty-eight minutes past five o'clock, in the afternoon of the same day, I gave a dog of similar size twenty-eight grains of the seeds of *C. Thevetia*, with an ounce and a half of distilled water. One minute after having swallowed this poison, the animal had the hiccough with vertigo. He attempted to walk but was unable to stand. At forty-six minutes past five, he vomited a viscous matter; he appeared nearly insensible, and his breathing was very slow. At five minutes before six o'clock, all his members were completely paralyzed; he groaned mournfully, and lay entirely motionless. The pupil of the eye was much dilated, and insensible to light; respiration was extremely laborious, the extremities cold, and the pulse feeble and trembling. At six o'clock he died.

Appearances on Dissection.

All the blood-vessels leading to the brain over-distended with blood.

The arachnoid membrane very much injected.

Some water at the basis of the brain.

The auricles and ventricles distended with clots of black blood.

The stomach much contracted; its blood-vessels slightly injected; the mucous membrane towards the great arch, and the pilorus, of a dark red colour.

The mucous membrane of the duodenum much inflamed, and containing a mucous fluid, of a spongy yellow colour.

From this dissection, it may be concluded that the animal had suffered a violent gastro-enteritis, which brought on death more rapidly, by making a strong impression on the nervous system.

This poison then belongs to the class of acrid-nervous; and I am induced to believe that the peculiarly active poisonous principle is prussic acid.

An ACCOUNT of the COLUMBITE of Haddam, (Connecticut,) with Notices of several other NORTH AMERICAN MINERALS. By JOHN TORREY, M. D. Read March 1, 1824.

THE history of Columbium is recorded in almost every work on Chemistry and Mineralogy, and is familiar to all who have made these sciences their study. Though it is now twenty years since Mr. Hatchett made his interesting discovery, the only North American specimen of Columbite known until lately, was the original one in the British Museum, and even the precise locality of that is not known. It is said to have been sent many years since by the late Governor Winthrop, of Connecticut, to Sir Hans Sloane, then President of the Royal Society; after whose death it was deposited in the Museum where it still remains. According to a notice in the 8th volume of the New-York Medical Repository, the locality is said to be near a spring not far from the house of Gov. Winthrop, near New-London. It has, however, been many years sought for without success; and some mineralogists have doubted whether the specimen in the British Museum was found in Connecticut, or in any part of this country; but that it was a Swedish specimen of Tantalite, which had by mistake been labelled as North American.

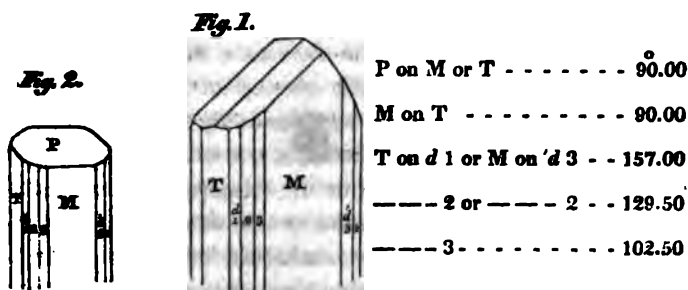
In a collection of minerals which I sent many years since to Count Trolle Wachtmeister, this distinguished savant informed me, that in one of the specimens from Haddam, containing cymophane, beryl, &c. Professor Berzelius had detected the Tantalite, and that it exactly resembled that of Finbo in Sweden. A notice of this discovery I published in the 4th volume of Silliman's Journal, but it has been overlooked by Cleaveland in the second edition of his excellent work, and also by Phillips in the last edition of his Mineralogy. As soon as I received this interesting information, I carefully examined the one or two specimens of the Haddam rock

remaining in my possession, but without finding the substance which I supposed Berzelius alluded to; and since that time, until lately, I had made no other search for it. A few weeks since, however, in examining some splendid specimens of the above-mentioned remarkable rock, presented to me by Col. Gibbs, I observed disseminated through one of them, several small masses of a blackish substance, having the appearance of an ore of Manganese. On a more attentive examination, it presented some unusual characters, and at length I discovered a considerable number of minute crystals, which were evidently of the same mineral with the masses. It occurred to me that this was the Tantalite of Berzelius, and a chemical examination of the small portion of the mineral which I could sacrifice for this purpose, left little doubt on the subject. The following is a more particular description of the mineral.

It occurs in small amorphous masses, and in minute crystals, disseminated in a granitic aggregate, consisting of quartz, albite,* talc, friable manganesian garnet, beryl, cymophane, &c. The amorphous masses, which are probably very imperfect crystals, are from one-fourth to half an inch in diameter, of a grayish-black colour, with the surface always more or less irised. It is opaque. Its structure is imperfectly foliated. Its fracture is somewhat conchoidal. It is not magnetic, either before or after being heated with charcoal. It is sufficiently hard to scratch glass, but not to strike fire with steel. The powder of the mineral is very dark brown. Specific gravity 5.90. Before the blow-pipe it is nearly infusible, the smallest fragment being slightly rounded on the edges. Borax dissolves it very slowly, forming a pale yellowish glass.

* CLEAVELANDITE of H. I. Brooke, Esq. as proposed in the last edition of Phillips's Mineralogy. It is a subject of regret, that this name must be given up for that of ALBITE, the latter having been several years since proposed by Hisinger and Berzelius for those varieties of Feldspar having a base of soda.

The crystals are very minute, being seldom greater in diameter than a common pin, and often much less; yet many are extremely perfect. The greater number of these crystals is imbedded in the singular friable garnet, which Mr. Seybert has ascertained to contain 30 per cent. of manganese. In one instance, I found them long, very slender, and disposed in a radiating manner. They are often grouped or intersecting, and are very brittle. The form of the crystal is that of a compressed rectangular prism, usually truncated on the lateral edges, or a four-sided pyramid, two sides of which are, in most instances, unduly extended. According to Phillips, the primary form of the Columbite is a right rectangular prism. The annexed figures represent two of the crystals with the measurement of the angles taken with the reflecting goniometer. No. 1 is the most common. This, it will be seen, much resembles a figure of Columbite in the 3d edition of Phillips's Mineralogy, except in some of the minor truncations.



A small quantity of the powdered mineral was fused with six parts of potash and one of borax. A mass of a deep green colour was obtained. Muriatic acid, poured on this, left a white powder, which, from the small quantity of the ore operated upon, could not be particularly examined, but it appeared to be oxyd of Columbium. The muriatic solution was found to contain iron and manganese. I regret exceedingly

not having a sufficient quantity of the mineral to make a complete analysis; but its external characters, crystalline form, and the few chemical experiments I have made, together with the great probability of the substance I examined being the same alluded to by Berzelius, leave little doubt that it is Columbite. Still I hope, by examining a considerable number of specimens, to find a sufficient quantity of the ore to undertake a detailed analysis.

If I am correct in my determination of the Haddam mineral, we have a clue, perhaps, to the discovery of the long-lost Columbite. The original specimen is said to have been found in New-London, which place is not more than 25 miles from Haddam. It is true, that the largest piece of ore yet seen from the latter locality, does not much exceed half an inch in diameter, while that in the British Museum is said to weigh several ounces; but it is reasonable to expect, that, when the new locality is thoroughly explored, masses of considerable size will be discovered. There is another circumstance which favours the opinion that the mineral analyzed by Mr. Hatchett is of the same variety, and from the same locality, as that of Haddam, which is, the specific gravity of the latter. The North American Columbite was found by Dr. Wollaston to be much lighter than that of Sweden, the cause of which was supposed to be small cavities in the former, and in confirmation of this opinion, I would mention that the Haddam Columbite, when immersed in water, continued to give out minute bubbles of air for a considerable time, after which the specific gravity was much increased.

Phosphate of Manganese. There is but a single North American locality of this rare mineral given by Cleaveland, who remarks, that "it is said to occur in Pennsylvania." I have not been able to ascertain either in what part of that state it is to be found, or upon whose authority the locality is given. About a year since, Mr. Nuttall placed in my hands

for examination a mineral, which he discovered in the vicinity of Philadelphia, which I have ascertained to be a Phosphate of Manganese. It occurs in small imperfectly laminated masses, imbedded in granite, near the New Water Works. It is of a brownish black colour, with a chatoyant lustre. Its streak is rather light brown. It is soft enough to be cut with a knife. Alone before the blow-pipe, it is easily fusible, with ebullition, into a black glass. With borax it forms a violet glass.

Sulphuret of Antimony. My friend Mr. Oliver Bronson, an active mineralogist of this Society, has put it in my power to add this and the following mineral to the already extensive catalogue found at Mr. Lane's mine, Huntington, Connecticut. It is found incrusting and partly filling up cavities in quartz, and is associated with sulphuret of iron. It is of a lead-gray colour, easily scraped by a knife, and is almost entirely volatilized before the blow-pipe, exhaling the odour of sulphur, but without any arsenical smell.

Carbonate of Iron. This, like the preceding mineral, occurs in cavernous quartz, in small drusy crystals, of a yellowish-brown colour, and is associated with the sulphuret and micaceous oxyd of iron. It dissolves very slowly, with effervescence, in muriatic acid. Before the blow-pipe it becomes black and magnetic, and when urged by the most intense heat throws out brilliant scintillations.

AN ACCOUNT of the PHOCA CRISTATA, recently taken in the vicinity of this city. By JAMES E. DEKAY, M. D. Read March 1, 1824.

AN animal of the genus *Phoca* is now exhibiting in this place, under the absurd name of *Sea Elephant*. As every thing connected with the history of this obscure genus is interesting to the naturalist, I have examined the animal, and drawn up the following description :

Length of the (whole) animal, from the symphysis of the lower jaw to the root of the tail, seven feet. *Body* cylindrical, tapering gradually to the tail, and covered with flattened hairs about an inch in length. *Colour* gray and dark brown, distributed in irregular patches. The grayish appearance is produced by very short hairs beneath the white. On the abdomen the gray predominates. The extremities are of an uniform blackish brown. *Head* small in proportion to the body, but furnished with a peculiar appendage, which, when dilated to its full extent, more than equals the head itself in size. This appendage, which is termed a hood, is a moveable muscular bag, capable of great dilatation, extending from the rostrum to about five inches behind the eyes, and in certain positions, nearly covering the internal canthi. It is twelve inches in extent from the nostrils to its posterior part, and nine inches in height. Externally it is of a bright brown, covered with short hairs, and exhibits many slight transverse rugæ. At its juncture with the integuments behind, a few strong hairs are observed, which may be considered as appertaining to the eyes, similar to other animals of this genus. The *nostrils* are round, each two inches in diameter, and placed in the anterior part of the hood. Through these the foreign substances employed in distending the hood for exhibition were introduced. When the hood is not distended, the cartilaginous

septum nasi is distinctly felt from the outside, rising forwards, and at its greatest elevation about six inches high.

Eyes large, six inches and a half from the extremity of the upper jaw, of a dull greenish hue, the cornea very flat. *Ear openings* distinct, situated two inches and a half behind and beneath the eyes; no concha, nor even its rudiment, could be observed. Cheeks and hood furnished with twenty-five to thirty strong mastaces (*Illig.*) on each side, arranged in rows converging forwards. The mastaces of the upper rows black and small; of the inferior rows whitish, very stout, flattened, and about five inches in length; all directed downwards. When examined minutely, they seem to have a series of short alternate bevels on each edge, but no spiral turns. The *tongue* large and fleshy, and divided at its tip to the depth of half an inch.

Teeth thirty in number; above, four incisors, two canine and ten jaw teeth; below, two incisors, two canine and ten jaw teeth. The incisors above are cylindrical and approximated; the two inner are small; the exterior much larger, and nearly half the size of the neighbouring canine. The canine are considerably larger than those of the lower jaw, and more incurved. The incisors of the lower jaw are very small and cylindrical; the jaw teeth above and below are small, distant, and have each a cutting edge; on the posterior part of this edge, a notch or transverse indentation is visible. The first is placed at some distance from the canine, and is much smaller than the others.

The *anterior swimming paws* are small in proportion to the size of the animal, of a uniform dark brown, except near their junction with the body, when they assume the mottled appearance of that part. They are furnished each with five strong, compressed, channelled claws, dark at their base, and of a light horn colour at the tips; the exterior largest. The distance from the origin of the anterior part of the swimming paws to the end of the jaw, is twenty inches. The length of

these members is fifteen inches. The *posterior swimming paws* are lunated at their extremities, and are fifteen inches in length. They are furnished with five depressed claws, or rather horny laminæ, of which the external are largest. They are all placed at some distance within the webbed extremities. When expanded, the posterior extremities are fifteen inches in breadth. The *tail* is six and a half inches in length, and at its base is three broad. It is flattened, furnished with hair similar to that covering the body, and tapers gradually to the tip. Weight estimated at between five and six hundred pounds. It is a full grown male.

It was taken in a small creek emptying into Long-Island Sound at East Chester, about fourteen miles from this city. The animal made considerable resistance, but exhibited no symptoms of fear. The captor succeeded in diverting his attention by means of a dog, and was thus enabled to destroy him by repeated discharges of his musket.

In the foregoing description, the remarkable peculiarities presented by the teeth cannot escape notice. The incisors resemble the canine so much in form, that their actual position alone can serve to point out their nature. Pennant, in the Arctic Zoology, describes four above and four below, being led into this error by confounding the laniary teeth with the incisors. The molares, or what with more propriety may be designated as jaw teeth, are very small in proportion to the size of the animal, hardly exceeding those of a child of five years old. The whole number of teeth in this tribe, varies from thirty to thirty-six. It is a curious coincidence that the different species distinguished by a great developement of the hood, or appendage to the head, are equally remarkable for the same number of teeth. Thus the *Ph. leonina*, Gm. (*proboscidea*, Peron.) and the *Ph. cristata*, Gm. have but two incisors below, indicating a very natural division in this partially known family.

The uses of the hood are obscure. The captor of this animal relates, that when he first commenced his attack, he

inflated this part, and made a bellowing noise, and that it continued inflated until he expired. Its use in defending the head and eyes from hail, sand, &c. as related by Egede, and implicitly followed by all subsequent writers, is, to say the least, problematical. The fishermen believe, that it is a sort of reservoir for air, which the animal uses when under water. Its great bulk, when distended, would however prevent the animal from descending freely, or moving with facility beneath the surface of the water. It is said by most writers to be a sexual distinction; and there can be little doubt but that it is more strongly developed in the males. The connexion of the nostrils with the hood, the configuration of this part, and the numerous mastaces with which it is furnished, indicate its importance as subsidiary to the sense of smell. The weak arms of offence and defence allotted to this animal render it necessary that this faculty should be exercised in the greatest possible degree.

With respect to the place it should occupy in the systems, I have little hesitation in considering it as the *Phoca cristata* of Gmelin, *Phoque a capuchon* Cuvier, the Hooded Seal of Pennant.* In the "Histoire des Peches des Hollandois," vol. I. p. 216, it is stated that the usual residence of this seal is at the entrance of Davis' Straits. Pennant mentions, that it is sometimes seen in Newfoundland. This is the first individual, as far as I can learn, that has been found within the limits of the United States.

* As Pennant's Arctic Zoology is a work to which few have access, I have added an abstract of his description of the hooded seal. "P. with four cutting teeth above and below; fore-feet like the human; thumb long; membrane on the hind feet extends beyond the claws. On the forehead of the male is a thick folded skin, ridged halfway up, which it can inflate, and draw down like a cap, to defend its eyes against storms, &c. The females and young have only the rudiments of this guard. It has two species of hair, the longest white, the shortest thick, black, and woolly, which gives it a beautiful gray colour; grows to the length of eight feet. The Germans call it *Klapmuts*, from its covering its face as if with a cap," &c.

As it does not seem sufficiently distinguished from the others in the systems, I propose the following specific character :

P. cristata. P. capite inauriculato ; alis nasalibus (maris) permagnis, utrem simulantibus ; dentibus primoribus maxillæ superioris quatuor, maxillæ inferioris duobus ; molaribus utriusque maxillæ decem.

My thanks are due to the draughtsman of the Lyceum, Mr. H. Inman, for the very faithful delineation which he has made of this animal.

Plate VII.

In a work now publishing in a series of numbers at Paris, by Frederick Cuvier, under the title of "Des dents des Mammifères considérés comme caractères zoologiques," a work remarkable for the accuracy, minuteness, and extent of its observations, I find a species of *Phoca* mentioned, which, as far as the teeth are concerned, corresponds almost exactly with the *Phoca cristata* just described. It is there said to have been sent from New-York* by our associate Mr. Milbert, under the name of *Phoca mitrata*, *Phoque à mitre*. It is possible that this may have been brought here from the north by

* The localities of American animals, as given in European works, are often erroneous. Pennant has described many animals as from New-York, whose natural abodes are often far in the interior of the continent. The cause is obvious. New-York, independent of her intercourse with foreign nations, is the great mart for furs, peltries, &c. from the north-west regions. Cuvier, in his great work "Sur les Ossemens Fossiles," ed. 2. t. IV. p. 43. mentions having received the horns of the *Cervus hippelaphus*, an Asiatic animal, from New-York. He states that they were brought from the Northwest coast, by the expedition under Lewis & Clarke. It is possible that these horns may have been carried thither by some of the numerous vessels navigating between the Northwest coast and Asia, or were brought to this port directly from the latter country. In the cabinet of the Lyceum are several incisors and canine teeth of the Hippopotamus. These were taken from a sealing vessel in this harbour, which had just arrived from the South Sea, and what is worthy of remark, they are said to have been found on the shores of the Falkland Islands.

a whaling vessel; should this prove to be the case, I should be inclined to believe that it is absolutely identical with the *Phoca cristata* described above. In the most recent works that I have been enabled to consult, I find no description of the *Phoca mitrata*; but from the details given by M. F. Cuvier of its osteology, the following are the most striking differences: the head, to judge by the plate, No. 38. B., is less than one-half the size of the *Phoca cristata*; the jaw-teeth are more closely approximated, the furrows in them deeper, and the last two are doubly furrowed.

APPEARANCES on Dissection of the PHOCA CRISTATA. By E. G. LUDLOW, M. D. and F. G. KING, M. D. Read March 15, 1824.

AFTER the minute account of this animal already read by Dr. Dekay, in which so precise a description of the head and teeth is to be found, we have little left to offer.

The head in general, although strongly resembling that of the dog, has nevertheless a striking peculiarity on its upper surface.

About two inches from the extremity of the upper jaw on its superior surface, rises a cartilaginous crest, rapidly increasing in height as it passes backwards, being about seven inches in height at its posterior or vertical edge, which is separated into two planes, by an intervening depression of an inch in depth.

Its superior edge is slightly convex, and the whole structure is clearly an elongation of the septum of the nose, the true nostrils opening on each side of it by an oblong fissure.

This crest rises into the hood, or sac-like appendage of the head.

This hood is strongly muscular, with an aggregation of circular fibres around its external orifices, which are two, situated at the lower anterior part of the hood: these probably served the purpose of sphincters, so as perfectly to close the sac.

The length of the upper jaw beyond this crest, is chiefly attributable to the ossa intermaxillaria, which are long and broad.

The entire number of teeth is thirty; for an accurate account of which we refer to the preceding paper.

The spine consists of twenty-nine pieces, viz.: five cervical, fifteen dorsal, two sacral, and seven caudal vertebræ, which were not complete, as a part of the tail had been cut off; from report, however, there must have been as many as ten caudal pieces.

The ribs were fifteen in number, flat and slender. The pelvis was long and narrow, having a direct diameter of only three and a quarter inches, and resembling that of the otter. Its cotyloid cavity inclined a little upwards, to which a strong short femur is attached. Thyroid foramen small, and filled with a dense ligament.

The anterior and posterior swimming paws were exactly similar in structure to the extremities of man; having however a less number of metacarpal and metatarsal bones.

In the anterior swimming paw, the phalanges decrease regularly from the thumb to the little finger, whilst in the posterior, the first and last fingers are longer than the intermediate ones apparently, but not in reality, as this seeming increase is dependent on an increased length of nail. The fingers are not separate, but connected by a very thick web, the claws appearing on its upper side and reaching to, but not overlapping the margin of the web.

The diaphragm very strong and thick.

The eye is very peculiar, perfectly spherical, with the nerve entering directly in the axis of the ball. The sclerotica di-

vided at its middle entirely around, its two edges connected by an elastic membrane thickly covered by muscles. The posterior half is subdivided into four longitudinal segments, extending from its edge to within a quarter of an inch of the entrance of the optic nerve.

This structure, by elongating the axis of vision, may enable the animal more clearly to discern distant objects, and also by the reverse to draw the eye deep within the socket during repose, especially as there are no moveable lids, but only the *membrana nictitans*.

The lens is spherical, the iris broad and evidently muscular.

The penis strongly resembling that of the dolphin and porpoise, but containing a cylindrical bone seven inches long, with a small groove on its under side.

Testicles very large, and strongly exhibiting the *corpus pampiniforme*. They were without the pelvis, and the size of the abdominal ring compared with that of the testis, forbade all belief that they could ever repass into the abdomen, unless very much lessened in size.

The *os hyoides* has a delicate body, slightly semilunate, without tuberosity or apophysis. The posterior cornua complete the arch, these are flattened, and gradually increasing in width, as they approach the thyroid cartilage, they terminate in a rounded obtuse extremity.

The anterior cornu is composed of three bones, the first of which is short and thick, the middle one has a large base, gradually tapering towards its junction with the third, which in length and delicacy exceeds the others, being cylindrical in its body, and condyloid in its termination.

The aretenoid cartilages were unusually large and long, and from the nature of their joint, admit of motion in all directions; and it will be well here to remark, that the closing of the *rima glottidis* is effected by a peculiar cartilaginous structure. There was also a peculiarity in the muscular structure of this part worthy of note, for the *aretenoidæi*

transversales, instead of running directly across, met in a tendinous centre line, and there was but one aretenoidæus obliquus. The trachea in length from its bifurcation to the os hyoides was twenty-four inches, and composed of flat cartilaginous rings, with undulating edges. At the junction of the extremities of each ring, the ends overlap each other about half an inch, and as nothing but a loose cellular structure intervenes, they may, by this means, be enabled to admit of much distention if necessary.

The œsophagus, particularly near the pharynx, was completely studded with large mucous glands, gradually disappearing as they approached the

Stomach, which was simple, though large and strongly muscular, exhibited a velvety coat, internally for about two-thirds its length from the pylorus, its larger end being more like the lining membrane of the œsophagus. Its length is three feet, curved one foot upon itself.

The intestinal tube exhibited no peculiarities, being nearly invariable in size both in the large and small intestines.

Cæcum very short.

On the mesentery, near the duodenum, a long spongy glandular body was observed; from its situation, probably the pancreas, although no ducts were visible.

The bladder, as in the human body, but more muscular, exhibiting a beautiful arrangement of circular, spiral, and longitudinal fibres. The prostate gland obcordate, very large, and had a portion of the urethra imbedded in it. The kidney large and lobulated, exhibiting a sort of reticulated surface, with hexagonal compartments.

Liver of the same colour and consistence as in man, but composed of six distinct lobes, three large, and the same number small, all with acute terminations, with numerous lobuli, irregularly scattered through them. The transverse fissure was very indistinct, although the vena portæ was disproportionately large.

The heart, like that of all the mammalia, was very large, and by inflation and injection, we satisfied ourselves that the foramen ovale was closed ; so that the opinion of Cuvier, that the foramen ovale is not open, but that the size of the vena portæ answers the same purpose, by enabling the animal to remain long under water without breathing, is confirmed by our observations on this animal.

OBSERVATIONS on the *North American species of the genus GRATIOLA*. By Capt. JOHN LE CONTE of the U. S. Army, F. L. S. &c. Read March 22, 1824.

Is certainty unattainable in human pursuits, when they are not connected with mathematical science ? This question, which has been so frequently asked, must have presented itself with peculiar force to the mind of every naturalist. He sees every where around him systems adopted and laid aside ; facts at one time admitted, and almost immediately afterwards controverted ; what but a few years ago was considered as fixed beyond the reach of doubt, now entirely overthrown ; new names, new distributions are for ever appearing : while nature, from whom all these things are pretended to be derived, is unchangeable. Can what is so variable have proceeded from her ? or do we only flatter ourselves, when we call the suggestions of our fancy, the arrangements of nature ? Nature is constant, but our own prejudices, our vanity, and our blind presumption mislead us. Few, however willing they may be, see with their own eyes. The authority of personal experience, weighs nothing against the whims of a favourite author, and we willingly choose to fetter our reason, and to entangle our faculties in the mazes of others' imaginations.

In the present state of botanical knowledge, these remarks will apply to almost every genus which contains species not commonly met with, or extensively diffused. The imperfect descriptions of the elder investigators of our natural productions, who considered brevity as the very essence of correctness, have left to us and to our successors a fruitful source of contention and doubt. Who can say, that a species designated in Gronovius, only by a solitary characteristic, is identical with any now produced, although that characteristic belongs to it; when the very mark upon which so much stress is laid, is found not to be peculiar to one species, but common to many? Shall we appeal to Herbaria? Age and the distortion produced by preserving these delicate objects, entirely alter their appearance. Besides, the variations occasioned by climate and seasons, and difference of soil can only be known to him who examines them in their native situations. A thousand accidents may occasion apparent differences, where none in reality exist. Colour is fugitive and variable; magnitude inconstant, pubescence frequently the effect of a luxuriant growth, and the want of it, of the reverse; all of which except in living plants, are apt to deceive. I add to all this, one more fruitful source of confusion, the insatiable desire of discovering new species: but were we able to check this desire, and to come to our investigations with a cool judgment, and a well-regulated disposition to correct the errors of others, rather than to advance our own celebrity; this would be our first rule of conduct, that to diminish the number of species, is of more benefit to science, than to increase them.

I take up the small genus of *Gratiola*, almost at random, and find extreme difficulty in clearing it of confusion. Modern errors are heaped upon ancient, and our latest writers instead of throwing aside as useless, the indeterminate species of former botanists, seem to delight in preserving them in the enumeration of what they please to term known plants. The

half of our botanical books consists of synonyms, and references to different authors, no matter how obscure, or how little known, and he who collects the most of this rubbish, concludes that he has laboured most in the cause of science.

Before proceeding to investigate this genus, it may be well to observe, that the shape of the capsule is variable, sometimes even in individuals of the same species; that the bracteal leaves or appendages to the calyx are found in all; and that there never are four fertile stamina.

1. *Carolinensis*. Stem smooth, little branched, procumbent at the base, the upper part tetragonal, the lower terete: leaves sessile, oblong, lanceolate, rather obtuse, dentate, three-nerved: peduncles pubescent, short; calyx-leaves linear-lanceolate, equal, entire; bracts broader, expanding; corolla white, internally pubescent; sterile filaments none; capsule globose. Inhabits in wet grounds from Carolina to Florida. 2. Is sometimes found with part of the stem and some of the leaves pubescent.

This species, which is the largest in America, has a very striking resemblance to the *G. officinalis* of Europe, but the description points out the differences. It is remarkable what confusion reigns among all writers with regard to it. Michaux saw its resemblance to the European species, and considered it the same. Persoon, struck by the circumstance of its wanting the sterile filaments, makes a subspecies of it. Mr. Elliott, who persuaded himself that the *G. aurea* was the *officinalis* of Michaux, makes a new species of it under the name of *G. sphaerocarpa*; and Pursh, who never saw the plant but in dried specimens, which he obtained from me, without hesitation pronounces it the *G. acuminata* of Walter, and thus it becomes again the *G. megalocarpa* of Elliott. It is doubtless the *G. virginiana* of Walter: and may be the *G. peruviana* of Feuillé, for it would not be strange that a plant found in the lower parts of our southern states, should extend into Mexico and South America.

2. *Virginica*. Stem more or less pubescent, branching at the base, assurgent, terete; leaves smooth, sessile, lanceolate, rather obtuse, dentate on the upper part, attenuated at the base: peduncles long, setaceous, pubescent: calyx-leaves equal, lanceolate, obtuse; bracts broader: corolla white, internally pubescent, tube yellow; capsule ovate, rather acute: sterile filaments none. Inhabits from Canada to Mississippi, but is never found in the low country of the southern states. 24.

3. *Viscosa*. Stem assurgent, viscosely pubescent, subterete: leaves smooth, sessile, ovate-lanceolate, rather acute, dentate, three-nerved: peduncles long; calyx-leaves equal, linear-lanceolate; bracts broader, expanding, shorter than the calyx; corolla internally pubescent, whitish striped with purple, tube yellow with two sterile filaments, capsule ovate, as long as the calyx. Inhabits Virginia, and the upper parts of North Carolina. 24.

This species was first discovered and named by Mr. Schweinitz: it is the *G. virginica* of Elliott, although in his description, he omits to mention the viscosity of the stem, probably because he described from a dry specimen.

4. *Aurea*. Smooth, stem tetragonal, repent at the base, branching: leaves sessile, oblong-lanceolate, punctate, dentate or very entire, acute, or sometimes rather obtuse; peduncles long, pubescent, setaceous; calyx-leaves equal, linear; bracts linear expanding: corolla yellow, internally pubescent, capsule ovate, rather acute: sterile filaments two, minute. Inhabits from New-York to Florida. 24.

This species was first distinguished by Mühlenberg. It has, by all our late writers, been considered as the *G. officinalis* of Michaux, and even by some, said to resemble the *G. officinalis* of Europe very much. But if any reliance is to be placed upon the representations which have been published of that plant, it must have required a peculiar obtuseness of sight to trace any resemblance between them. This has

flowers of a remarkably brilliant yellow, those of the European plant are white.

5. *Quadridentata*. Rather smooth; stem terete, procumbent, sometimes viscous: leaves sessile, lanceolate, acute, subpunctate, four-toothed, the two anterior teeth longer: calyx-leaves unequal, linear; bracts small, only on the flowers which first appear, the later ones being deprived of them: corolla white, internally pubescent, tube yellowish; sterile filaments two, small; capsule ovate, acute, shorter than the calyx. Inhabits from Carolina to Florida. ☉.

Nature is constant in preserving either entire, or by rudiments, those characteristic marks which serve to connect together any class of her productions, and to distinguish it from others. In those species of the present genus where the sterile filaments are wanting, the places which they ought to have occupied, are marked by small points, and it is not difficult in those that want the bracteal appendages to the calyx, to point out their rudiments. It has been suggested, that the simple calyx of this species, ought to constitute it a distinct genus: but the discovery that it really has bracts upon the flowers which first appear, should render innovators more cautious of proposing alterations in our present arrangements, and more circumspect in what they advance concerning facts, that others may examine with more attention than they themselves have thought necessary to bestow upon them.

6. *Pilosa*. Erect, branching, very hairy; stem tetragonal; leaves sessile, ovate, dentate; flowers sub-peduncled: calyx leaves unequal, the two intermediate ones small, setaceous; corolla white, internally smooth, sterile filaments two, very small, scarcely visible. Inhabits in the dry pine forests from Carolina to Florida. ☉.

Called by Walter, *G. Peruviana*. At first sight it scarcely resembles a *Gratiola*.

7. *Anagallidea* of Michaux. Of this species I can say but little, having only once casually seen it, without particularly examining it. The description we have in the *Flora Boreali-Americana* is as follows: "Erect, very smooth; stem tetragonal: leaves oblong-oval, sparingly denticulate, shorter than the flowers: calyx without bracts, subulate, pubescent: corolla internally smooth: leaves most commonly obtuse: corolla pale bluish." The plant which I saw had very small whitish flowers with violet veins.

Mr. Elliott's *G. tetragona*, if it be a *Gratiola*, may be this species of Michaux. He describes his plant as being "smooth, with a procumbent tetragonal stem rooting at the joints: leaves sessile, lanceolate, acute, from four to six-toothed, obscurely three-nerved: peduncles two or three lines long, tetragonal: calyx leaves equal, linear, finely serrate, corolla white with coloured streaks, (what colour?) capsule oblong, acute, somewhat compressed and oblique, as long as the calyx.

I am aware that all our American botanists have been in the habit of considering the *G. anagallidea*, the same as the *Lindernia attenuata*. But neither Michaux, nor the distinguished gentleman who assisted him in the publication of his work, could have confounded two genera so unlike in every respect. Mr. Elliott's *G. tetragona* may be something different from what I have supposed it to be; for he has confounded our present genus with *Herpestis*, in a very remarkable manner; nor has he left that genus in a much better state.

The *G. acuminata* of Mr. Elliott is the *Herpestis cuneifolia*; his *H. cuneifolia* the *H. Brownei*; his *H. rotundifolia* the *H. amplexicaulis* and his *H. micrantha* the *Hemianthus micranthemoides* of Nuttall.

NOTES on some new Supports for Minerals subjected to the action of the common Blow-pipe. By Lieut. Col. J. G. TOTTEN. Read April 26, 1824.

JAMES SMITHSON, Esq., in a letter to the editor of the *Annals of Philosophy*, on the subject of securing small particles for examination by the blow-pipe;* communicates several ingenious modifications of Saussure's process with splinters of sappare, which process he observes, "has been scarcely at all employed; owing partly to the excessive difficulty, in general, of making the particles adhere, and in consequence of the almost unpossessed degree of patience required, and of the time consumed by nearly interminable failures." Mr. Smithson's processes are three. 1st. Small plates of clay "are formed by extending a white refractory clay, by blows with the hammer, between the folds of a piece of paper, like gold between skins. The clay and paper are then cut together with scissors," "into very acute triangles," affording a substitute for Saussure's sappare. 2d. Or a very little of the moist clay may be taken up on the end of a pointed platina, or other wire; and the object to be tried, being touched with it, will adhere. 3d. Or a paste may be made of some of the body itself, reduced to fine powder. With a paste of the powder of flint and water, "pieces of flint were successively connected to flint; and some of this paste taken up on the end of a wire, served, if not quite as well as clay, yet very sufficiently."

Pursuing the advantage gained by these improvements, Mr. Smithson made several interesting experiments; and, among the rest, found, "with much surprise, that flint can

* Reference is made to this letter for many interesting details. See No. 36 of the new series of those *Annals*: or No. 25 of the *Technical Repository*.

be melted without difficulty, and even when of considerable bulk."

Having, in common, I presume with all who have had occasion to refer to the blow-pipe for determining certain characteristic differences of minerals, been much dissatisfied with the limited power of the instrument when acting upon the usual supports of charcoal, platina forceps, &c. ; I was not less convinced, on reading the paper of this gentleman, that his improvements would greatly extend its utility, than gratified by the facility of their application, and the results he had already obtained by their use. With these impressions I have recently made a few trials ; which, as they indicate a greater power in the blow-pipe, at least as to one substance, than even Mr. Smithson attributed to it at the date of his letter, this society may not consider wholly uninteresting.

Not being able to obtain any clay sufficiently refractory for my purpose, though I tried the German, and the English (Stourbridge) clay, used for crucibles by glass-blowers, and two or three specimens called pipe-clay ; I had recourse to the minerals which I designed to expose to the action of the flame ; this is Mr. Smithson's third process. Instead, however, of taking upon the point of the wire a very minute portion of the paste made of the powdered mineral, according to Mr. Smithson's method ; I formed a paste by mixing the powder with very thick gum water ; and, rolling a little of it under the finger, formed a very acute cone, sometimes nearly an inch in length, and generally about a twentieth of an inch in diameter at the base. These cones, being held by the forceps, or attached to the end of a wire, or even of a splinter of wood, may be directed accurately upon the minutest visible particle ; and being a little moistened at the point with saliva, the particle will adhere to the very apex, under the strongest blast of the blow-pipe.

I conceived, that when a very small quantity of paste was used, the extremity of the wire or forceps must necessarily

abstract much heat from the fragment under examination, because it must itself be often within the limits of the blue flame ; and my object was, as much as possible, to insulate the fragment. These cones need not in fact be more than one quarter, or one fifth of an inch in length ; for so effectually is the conducting property of the mineral substance destroyed, by destroying the continuity of its particles, that one of these cones, of the length of half an inch, may be held at the base by the fingers with impunity, while the apex is in the focus of heat.

One great advantage of this method over the others is, that if fusion ensues, it is owing entirely to the nature of the substance experimented upon, and not in any degree to the agency of foreign substance acting as fluxes.

No. 1. *Precious Serpentine*—(From Phillips-town, N. Y.) melts instantly into a brownish yellow, blebby enamel : by continuing the heat, ebullition is observed, the colour is nearly or quite dissipated, and numerous wart-like elevations appear on the surface.

No. 2. *Precious Serpentine*—(From Easton, Pa.) a very lustrous and beautiful specimen ; same result as No. 1.

No. 3. *Precious Serpentine*—(Believed to be from Massachusetts) a dark green specimen ; melts with great ease at first into a dark green blebby enamel ; subsequent effects the same as Nos. 1 and 2.

Having recently seen the paper of Mr. Keating on the specific identity of Precious serpentine and Marmolite, I was most naturally led to examine this latter substance ; and if a corroboration of that gentleman's opinion were necessary, we might find it in my results.

No. 4. *Marmolite* of Nuttall—(Hoboken, N. J.) The effects precisely the same, in all respects, as in Nos. 1 and 2.

No. 5. *Com. Serpentine*—(Hoboken, N. J.) somewhat difficult of fusion ; the point of the cone alone, or a very

small particle attached to it, melts into a white blebby enamel.

- No. 6. *Black Flint*—(found in chalk) melts with more ease than No. 5, into a white enamel.
- No. 7. *Hornstone, black*—(found on the shore of the Delaware, out of place.) Result the same as with the flint.
- No. 8. *Hornstone, black*—(Black Rock, N. Y., imbedded in limestone.) Result the same.
- No. 9. *Chalcedony*—(shore of the Mississippi, out of place) melts without difficulty into a colourless vesicular glass.
- No. 10. *Carnelian, deep red*—(shore of the Mississippi, out of place) loses colour instantly, and fuses like chalcedony.
- No. 11. *Ferruginous Quartz, deep red*—(Brooklyn, N. Y., out of place) melts with about the same ease as flint, into a white glass globule, full of air bubbles.
- No. 12. *Fer. Quartz, yellowish brown*: called by some Hornstone—(Suffolk county, N. Y.) melts like No. 2.
- No. 13. *Common Quartz*—(shore of the Delaware, out of place.) This specimen is highly crystalline and transparent, but not rock crystal. The results of the experiments were, however, precisely similar to those with rock crystal, which are next detailed.
- No. 14. *Rock Crystal*—(West Canada Creek, N. Y.) For trial with this substance, a small crystal, having both terminations complete, and of the finest water, was selected. The extremity of the cone is converted into a globule without difficulty; but it is next to impossible to increase the globule first formed. The cone must be very acute, and, after being burned in the flame of a candle, is perceived to be rough and uneven with microscopical particles of the crystal; the blow-pipe converts the roughness into a smooth and shining surface, and the particle at the very apex into a globule of colourless glass, more or less vesicular.

I conceive this effect to be most easily produced after

the paste had been repeatedly dried, (without burning,) and as often restored to a suitable consistence by fresh addition of gum water ; and if so, it must be owing to these additions separating the particles more and more, and thereby lessening the communication of heat from particle to particle down the cone. The minutest fragment I could obtain by the hammer, or by rubbing together two sharp edges of large fragments—although attached to the extremity of a cone nearly as acute as a needle's point—was affected, by the greatest heat I could produce, if at all, in no other way than the rounding of its points and edges. We may therefore consider this substance as fusible only in a state of powder.

No. 15. *Sappare*—(Litchfield, Conn.) From a single experiment, which I have not had leisure to repeat, I infer that this substance is infusible before the common blowpipe. The apex of a very acute cone was not perceptibly altered.

From the experiments of Mr. Smithson, and from those stated above, it is obvious that the power of the common blow-pipe is greatly extended ; but it remains to be ascertained whether its field of usefulness, as a means of discriminating between substances of various composition, has been equally or at all enlarged. There are now, as respects the blow-pipe, two well-defined boundaries in the mineral kingdom ; and what do we gain by merely approximating these boundaries a little ? This approximation, however, is not all we are able to accomplish : we may, I conceive, erect a new wall of partition quite as prominent as those which now exist. Hitherto minerals were divided, in relation to this instrument, into three classes, namely—

1st, such as are fusible per se.

2d, such as are fusible only with addition ; and

3d, such as are infusible even with fluxes.

We may now subdivide and form classes equally distinct, to wit—

1st, such as are fusible per se, with ordinary supports.

2d, such as are fusible per se, in *microscopical particles*.

3d, such as are fusible only with addition ; and,

4th, such as are infusible even with fluxes.

This subject requires yet much attention ; and I hope some of the details given above may save from trouble and disappointment such as may be disposed to diminish the list of infusible minerals, or to simplify and extend the use of an instrument, so indispensable to the mineralogist.

ON the Remains of the MEGATHERIUM recently discovered in Georgia. By WILLIAM COOPER. Read April 19, 1824.

It has been already announced that remains of the great fossil animal of Paraguay exist within the limits of the United States ; and under a latitude nearly as far north, as they have hitherto been found south, of the Equator. We are indebted for the first intelligence of this discovery, which possesses so much interest for the lovers of natural science, to our learned associate professor Mitchill, distinguished by his previous contributions to the knowledge of the fossil productions of this country. In a paper contained in the present volume of these Annals, that gentleman has given an account of two fragments of teeth brought to him from an island on the seacoast of Georgia, which, at the same time that they differed totally from those of any quadruped now known to exist, presented the most striking resemblance to those of the *Megatherium*. To an animal of this very extraordinary, and now extinct species, he accordingly does not hesitate to refer them.

The information thus given, however, was calculated rather to stimulate than to satisfy the curiosity of naturalists. Although the fact of these remains existing in North America

might perhaps be considered as thereby established, yet its connexion with the most difficult problems in zoology and geology rendered it highly desirable to obtain other and more entire parts of the skeleton, and with them to institute a more extensive comparison. By means of this we might expect to discover any difference possibly existing between them, or else to determine, in the most unquestionable manner, the specific identity of the animal of Georgia with that of Paraguay.

These considerations induced me to address a letter to my friend, *Dr. Wm. R. Waring* of Savannah, begging him to make inquiry whether any more of these relics had been found, and if possible, to procure me some of them. His answer informed me that his friend, *Dr. Joseph C. Habersham* of the same place, had, with much trouble, and at some expense, assembled a collection of the bones found in the marshes of Skidaway Island, and at his request consented to allow them to be sent to this city, under the condition that they should be placed where they might be publicly viewed. They were transmitted to me in the month of March last, and in compliance with the wishes of the owner, are now deposited in the cabinet of this Society.

The collection was found to consist of parts of several members of the skeleton, which, as nearly as their very mutilated and disconnected state would enable me determine, were as follows :

A portion of the posterior part of the *right* side of the lower jaw.

Another portion which had been continuous with the preceding.

A considerable portion of the anterior part of the same jaw.

A fragment of the *left* side of the same jaw, about three inches square.

Five fragments belonging to three different teeth.

The vertebra dentata, with nearly one half broken off.

Three other vertebræ, two of which appear to be dorsal, and

the third either the last dorsal or the first lumbar. None of these are entire.

A fragment undetermined, but supposed to be of the ilium.

Eight pieces belonging to three or four different ribs. Three of these pieces have the heads attached to them, and two seem to have belonged to the left side, and the remainder to the right.

The head of the lower extremity of the humerus, with both condyles nearly entire.

Two pieces with a concavity at one end, perhaps the superior parts of a radius and ulna.

A bone supposed to be a tarsal, much broken.

Two carpal bones adapted to each other.

The heads of both femora; and a fragment, apparently the lower condyle of a femur.

Part of a bone about seven inches long, supposed to be part of a fibula.

Besides these were four or five other small pieces of bone, but so imperfect as not to be easily referred to their proper places in the skeleton.

In addition to the foregoing should be enumerated the two fragments of teeth from which professor Mitchill drew up his description. On being compared with Dr. Habersham's collection, one of them was found to correspond with a fragment supposed to be of a *fourth* molar, of which it formed the posterior process. The other, as it fitted with great exactness into what remained of the socket of the *third* molar, appeared to have occupied that place in the jaw. Thus it is rendered extremely probable, that all the relics of the *Megatherium* yet discovered, as far as we know, in North America, have belonged to a single individual.

I shall first endeavour to bring together some of these fragments so as to show what has been their original state; after which they may be compared with the figure and description of the animal of Paraguay, as given by M. Cuvier in the

Annales du Muséum, vol. V., and in the *Recherches sur les Ossements Fossiles*, vol. IV. first. ed. The original plates and description of M. Bru are not, with the exception of Pl. I., to be procured in this city, and that part of the second edition of the *Ossements Fossiles*, which relates to the fossil Edentia, if published, has not yet reached us.

Restoration of part of the lower jaw.

A and B (see Pl. VIII.) formed one continuous piece. Of this there can be no doubt, as the edges of the fracture, though very irregular, correspond perfectly with each other. These two portions compose the greater part of the *right* side of the lower jaw, and contain parts of the sockets of all the four molar teeth.

The plate represents two views of the jaw as partly restored, reduced to one fifth their natural size. Fig. 1. is an oblique view of the inside of the jaw. Fig. 2. a profile of the outside. The dotted line represents the part supposed to be broken off. For accurate drawings of these, I have to return my thanks to Mr. Inman, Draughtsman to the Lyceum.

C also belongs to the lower jaw. It consists of the anterior part, comprising the symphysis, with part of the elongation, and parts of the sockets of the two first molars. It has been continuous with B. This will be made more apparent when we come to the comparison with the skeleton of Madrid.

D (not in the plate,) is a fragment of the *left* side of the same jaw. This is evident from its containing parts of the sockets of the two last molars, part of the opening for the passage of the maxillary vessels, and the origin of the ascending branch of the jaw.

The teeth had fallen out of all the sockets except one, which contained the body of the second molar with the crown and fangs broken off, apparently by recent violence. I attempted therefore to find the places of the four remaining teeth. Two of them I perceived to be alike in all respects,

and therefore concluded that they had occupied corresponding situations in opposite sides of the jaw. Both are broken in two across, and consist of the crown and part of the body as far down as below the commencement of the internal pyramidal cavity. The longer of the two is about four inches, the other somewhat less. On trying the first of these, it was found to fit with great exactness into the socket of which part remains in B, and part in C, that is, the socket of the *first* molar. This, it may be observed, corroborates the approximation of these two fragments. Its form also showed this to have been its place; its diameter in the direction of its cutting edges being less than the contrary diameter, and its being narrowed anteriorly, proved its situation to have been in the thinner and more tapering part of the maxillary bone.

The *second* molar of the same, that is, the *right* side remained in its socket as already mentioned. It is remarkable for its rhomboidal form, the diagonal through its left anterior internal, and right posterior external angle, being the greatest.

The remaining two teeth appeared to belong to the *left* side of the same jaw. One of them I conjectured to be the *third*; 1st, from its fitting into a part of this socket remaining in D; and 2dly, from its form, which shows the passage between the rhomboidal figure of the second molar, and the flattened shape of that which I suppose to be the *fourth*. This last is more flattened, that is, broader in the direction of its cutting edges than any of the others; and from this, as well as from its agreeing with the form of the fourth socket partly remaining in D, I have referred it hither. This tooth may however have belonged to the upper jaw.

Comparison with the Megatherium.

Skeleton of Madrid.

Bones from Georgia.

The lower jaw is of a A considerable part of this
tolerably regular figure, if we remarkable elongation re-

except the elongation of its anterior part.

At the anterior extremity is remarked a small notch, which indicates probably the separation of these bones in the young subject.

At the origin of this elongation is found a protuberance considerably elevated, which, increasing in volume downwards, forms with the neighbouring one, two large eminences, between which is a canal corresponding to what anatomists call the symphysis in man.

It continues increasing successively in volume as far as (*S*³), where begins the inferior border called base, which is at least a foot long.

The two apophyses, viz.: the coronoid and the condyle are to be observed, with the angle of the jaw.

The superior border of this jaw is very thick in front of the coronoid apophysis; where

mainly in our specimen, as represented in the plate at (*a*) Fig. 1. and 2.

The anterior extremity being destroyed in the specimen from Georgia, this notch could not be observed.

Part of this protuberance may be observed at (*b*) corresponding in situation with those represented in the figure of *M. Bru*. The canal of the symphysis is well preserved, and very apparent in our specimen.

This part is broken off in our specimen; but from the depth and direction of the sockets, it is very evident however, that something similar to this must have existed. Part of the base remains at (*c*) with the border entire.

These parts are entirely broken off in the specimen from Georgia.

Our specimen agrees with this description in all points, except the inclination of the

* Appears to be *J* in the figure.

are incased four teeth in as many particular sockets, which incline slightly backwards.

From the first molar to the point P, this border continues diminishing in thickness, and with that of the opposite side, forms a canal very well adapted for receiving the tongue.

Finally, may be observed in this bone three openings, two of which are external, (Q & R.) The third being on the interior side could not be represented in the figure.

teeth, which differs somewhat. The fourth molar does indeed incline a little backwards, and perhaps also the third, although very slightly. The first and second rather incline forwards at the top, and as they descend, present a strong curvature backwards, as is seen in the socket restored by the approximation of B and C, as well as in the tooth itself.

All this coincides perfectly with what is observed in our fragment, C. The canal (d) is well preserved, and its commencement may be traced in B.

This is the only part of M. Bru's description in which it is difficult to find an agreement with the Georgia relic. There are indeed three openings, but they do not correspond in situation with those in M. Bru's figure, and are all external and on one side. This may be partly owing to some want of exactness in the references, or more probably to the injured state of our specimen, which at this place has a considerable portion broken off.

The fragments of teeth in Dr. Habersham's collection, for there is not one entire, agree with Bru's description of those in the skeleton of Madrid, so far, at least, as it is given in the French abridgment. There are the sockets of four in the right lower side, and consequently eight teeth in all, in the lower jaw, the six posterior being the greatest. They are square with rounded angles, and a groove between on the inner and outer sides, and are longitudinally striated. The inferior pyramidal cavity may be observed with advantage in the right second molar, which remains in the socket: but the terminating points are broken off from this as well as from all the others. Consequently, we are not enabled to ascertain their precise length, but it appears to have been at least seven inches, and probably more.

The heaviest of our teeth, which is the first of the right side, weighs nine and a quarter ounces. The fourth of the left side weighs nine ounces. To make them agree with the weights of the corresponding teeth as stated by Bru, we must suppose that more than half has been broken off the former, and from the latter nearly two thirds. This, from a comparison with the sockets, I should hardly suppose to be the case, at least with the latter.

The peculiar form of the crown of these teeth is not well represented in any figure I have seen, excepting that given by Professor Mitchill, to which the reader is referred. Their posterior crest is higher than the anterior. The posterior crest is known by the curvature of the tooth corresponding with that of the socket. This peculiarity does not appear in the figure in the "*Ossements Fossiles*," but rather the contrary.

Their remarkable structure, so much unlike any before observed, is still more deserving of a particular description. The tooth is covered externally with a coating of enamel, extremely thin, and uniformly so on all sides, and which does not extend over any part of the crown. Within is a coating of bone or ivory, which at the sides of the tooth is as thin as the

enamel; but where it is parallel to the cutting edges is nearly a quarter the thickness of the whole tooth. Enclosed within this is a second coating of enamel, which, like the first two, has two sides very thin. The other two sides are more than a line thick, and terminate in the cutting processes, which by this means are kept constantly sharp and prominent by the wearing away of the softer ivory on each side of them. Where these laminae of enamel terminate, on the anterior side of the higher process, may be observed a semilunated truncation, which is not seen on the lower process, although terminated in a similar manner.

The whole solid part of the tooth thus represents a prism of bone, enveloped in three cases, two of enamel, and the third of a substance similar to itself. There is therefore much analogy between this structure and that of the teeth in the genus *Bradypus*; which, says M. Cuvier, are simply "un cylindre d'os enveloppé d'email." In another passage he speaks of this enamel as an "étui tubuleux." We have thus an additional circumstance to show the affinity of the *Megatherium* to the *Sloths*.

Fig. 3 represents a transverse section, natural size, of one of the first molars, showing the arrangement and relative thickness of the coats.

Fig. 4, a longitudinal section of part of a larger tooth, showing the manner in which the interior enamel terminates the cutting processes.

Of the four vertebræ, three have little remaining besides the body, the processes being almost all entirely broken off. The other, which appears to be one of the dorsal, perhaps the third, is tolerably entire. It agrees with Bru's description of those of the *Megatherium*, excepting that I am not able to find the two holes which he describes in the atlas, and which, he says, are common to all the other vertebræ. As, however, this bone is much incrustated with various shells, they may possibly be covered or filled up.

The ribs, also, are too much injured to afford any very distinctive characters. Neither can I observe any thing peculiar in the condyles of the humerus, as we have supposed them to be, for nothing more of this bone remains besides the inferior articulating extremity. The remarkable enlargement described in the Madrid skeleton is entirely wanting. The two fragments conjectured to be the superior extremities of the radius and ulna, are in the same state, and present nothing but smooth and even concavities, with their edges partly broken. That supposed to be the radius exhibits on one side a smooth facet, where it may have played upon the ulna. One of these pieces is six, the other four inches long; the diameter of their cavities about four inches.

Of the two supposed to be carpal bones, the first, which is of a triangular figure, is the smaller. One side is convex and the other concave, with a slight elevation crossing it about the middle, which adapts itself to a corresponding depression in the other bone. It measures nearly five inches in length, and nearly three and a half in breadth, and is about an inch thick. The second is of a singular figure: one side is convex, as in the first; the other side has one half concave, while the other half swells out into a hemispherical knob. Its outline is quadrangular, and it is a little longer and broader than the first, with its concave end about as thick, and the other nearly three times that thickness, measuring through the knob.

The heads of the two femora are both nearly entire, and would perhaps be sufficient of themselves to prove the identity of our animal with the South American species. They are, as observed by M. Bru, "perfectly spherical, and with a superficies very smooth," and measure full twenty-three inches in circumference. The dimensions of the skeleton of Madrid are not given in detail in the French abridged description. Even if we had not the evidence afforded by the teeth, these huge condyles would indicate an animal of much superior bulk to the *Megalonyx*; for we can hardly imagine that a creature not

larger than an ox, which is conjectured to have been the size of this quadruped of Virginia, could be furnished with thigh bones of such disproportionate bigness. Indeed, they would seem calculated to encumber rather than support even the *Megatherium*, whose size is supposed by M. Cuvier to have equalled that of the *Rhinoceros*.

The other fragments being small and much broken, nothing satisfactory could be determined with respect to them.

My inquiries have not, as yet, enabled me to give any very precise information respecting the locality of these bones, or the character of the formation in which they were found. Their appearance, however, indicates that they have been overflowed by the sea; and they seem to have had one side imbedded in the earth or mud, while the other was washed by the salt water. They are thinly incrustated in some places with *Flustra* and other zoophytes, and have recent shells of the genera *Balanus*, *Ostrea* and others, adhering to them. All are remarkably hard and heavy, and of a deep black colour. They do not retain any part of their animal matter.

Drs. Waring and Habersham state that these bones are still to be procured in *great quantity*, by some labour and expense at the same place. They add, that bones of the same kind may be obtained at two other places, one called Whitebluff, is said to be also on the seacoast; the other at some distance up the Savannah river. We may hope, through the zeal and exertions of the same gentlemen, to whom the scientific public generally is so much indebted for the preservation of the remains which have formed the subject of these remarks, to have these interesting deposits further explored; and in a manner worthy of the great questions, which a proper examination of their contents would contribute so much to elucidate.

REMARKS on certain ENTOTZOICAL FUNGI. By ABRAHAM HALSEY. Read April 19, 1824.

IN the warm climate of South America, a fungus is frequently met with, growing from dead insects of the Vespæ and Grylli tribes. Specimens of one of these insects, with a fungus protruding from its sternum, were lately presented to the Lyceum by Dr. Madianna, from Guadeloupe, where it is known among the inhabitants by the name of *la guêpe végétale*, or vegetable wasp. Dickson first detected this species of fungus in England, and described it under the appropriate name of *Sphæria entomorphiza*. It is found there, and may occasionally be met with in this country, but always on the dead larvæ of insects. Our specimens do not coincide exactly with the description and figure of Dickson, though perhaps the discrepancy is not sufficient to constitute any specific difference, the *Sphæria* of the section to which the present species belongs (*clavata*) being liable to considerable variation. The clavula rises somewhat flexuously or spirally, and the capitulum instead of being globose, according to Dickson, is ovate. The most remarkable particular, however, respecting this fungus is the fact communicated by Dr. Madianna, that he has noticed the wasp *still living* with its incumbrance attached to it, though apparently in the last stage of existence, and seeming about to perish from the influence of its destructive parasite. Although nothing of a similar nature has been observed in the phanerogamous plants, our knowledge of the physiology of the fungi is still too imperfect to permit us to deny the probability that it sometimes occurs with these. It may be doubted whether the vegetable ever predominates over the animal life, while the vital principle of the latter is in full energy; but that the larvæ, in a feeble state, may have afforded a fit recipient for the seed of the fungus, while their complete evolution was retarded by some cause, until the final transformation of the

insect, is certainly not improbable. In this respect they may offer some analogy with the entozöical vermes, such as *tæniæ*, *ascarides*, *tetragulæ*, *hydatides*, &c. which are most commonly observed to prey upon animals of debilitated or languishing health.

A congener of this fungus, and nearly allied to it, the *Sphæria militaris* of Pers. is also remarkable for selecting for its nisus the larvæ of insects. I am not aware that it has been found in circumstances to support the inference that it was the cause of the death of the larvæ.

Besides these *Sphæriæ*, there is another class of entozöical fungi, of the genus *Isaria* of Pers. whose matrix is invariably dead insects in different stages, and which derive their peculiar characteristics from the various species upon which they have fixed their habitation. A species discovered by Mr. De Schweinitz, and described under the name of *Isaria sphingum**, is remarkable as being always found proceeding in all directions from the abdomen, nerves of the wings, &c. of a sphinx resting upon a branch with expanded wings, (with the curious additional circumstance that the leaves of the branch dry up, and preserve their green colour as in a Herbarium.) Although the animal was dead when thus discovered, yet the position in which it is usually detected, and the other attending circumstances, afford a strong presumption that the fungus was evolved while the sphinx was yet in a state of existence.

* Synop. Fung. Carol. Sup. p. 100.

RESEARCHES and EXPERIMENTS on some Species of the genus PASSIFLORA. By J. B. RICORD MADIANNA, M. D. Read March 8, 1824.

M. DECANDOLLE has perhaps been led into errors respecting the medical properties of the plants composing the genus *Passiflora*, from not having been placed in situations where he could properly investigate the subject. He asserts that "no species of the family of the *Passifloræ* is employed in medicine ; and that the stalk and leaves do not appear to possess any remarkable properties.* The fruit is pulpy, gelatinous, sweet, and edible, in almost every species ;" and he adds, "that in America the fruits of the *P. coccinea*, *P. maliformis*, and particularly the *P. quadrangularis*, are thus known."

The researches, however, which I have been enabled to make on these plants in their native situations, will satisfy the medical botanist that this celebrated Professor, so distinguished for his accuracy in other respects, has in this instance decided without proper examination. The *P. coccinea* L. bears a fruit which is certainly not edible ; neither is that of the red grenadilla *P. rubra* L., which the negroes of Guadeloupe call *Pomme zombi*. The *P. maliformis* L. the fruit of which is vulgarly known by the name of *Pomme de la Dominique*, is also inedible, contrary to the assertion of that admirable botanist ; and its pulp, which is difficult to be got at for its hard envelope, is inferior to that of the *P. fatida* L. (*mari gouja*) although the latter is in but little estimation. The flowers of this plant are considered pectoral, and are used by the negroes in infusion for colds, &c. Père Nicholson, in his work on St. Domingo, attributes to it anti-hysterical properties. The ashes of the plant are used by the planters in the composition of a ley for purifying the juice of the cane. M. Decandolle

* Essai sur les Propriétés Médicales des Plantes, par A. P. Decandolle.

likewise states that "no species of the family of the *Passifloræ* is employed in medicine." The *P. laurifolia* L. however, is noted for being commonly used, among all the inhabitants of the West Indies, as a most powerful vermifuge; and several physicians have spoken of its good effects in the highest terms. The root only is considered efficacious. The blue Grenada, *P. cærulea* L. is possessed of stomachic, antiscorbutic qualities, according to the observations of M. Descourtils in his *Flore médicale des Antilles*; and the experiments on the *P. quadrangularis* L. or Barbadine, which I shall presently relate, will sufficiently prove the inaccuracy of the distinguished Professor of Geneva, when he asserts, "that the whole genus *Passiflora* appears not to be endowed with any remarkable properties."

The Barbadine is cultivated without difficulty every where on the island of Guadeloupe; it is used to form delightful arbours; and nothing is more beautiful than this plant in full bloom, bearing its golden fruit of the form and size of melons, often weighing more than six pounds, and intermingled with large flowers, whose brilliant colours are finely contrasted by the deep and glossy green of its thick foliage. The leaves are large, soft, and of great use in calming the irritation produced by the application of cantharides. The root, upon which my experiments were made, does not penetrate far beneath the soil, but rather extends itself on the surface; its epidermis is blackish and easily peels off, leaving a bark of a vinous colour, thick, and detached without difficulty from the ligneous part, which is of a yellowish white, easily cut, and blackens the blade of a knife. Its smell is somewhat like that of a beet, and its taste sharp and astringent. The chemical analysis furnished me with a substance resembling *Morphine*, to which I have given the name of *Passiflorine*, and believe it to be as active as that of the new principle extracted from opium, or even more so.

There is a variety of the *P. quadrangularis*, the fruit and

leaves of which are one fourth the size of that just mentioned. This is preferred on account of the smallness of its seeds, and is not so common in the island as the other.

Experiments upon the root of the *P. quadrangularis*.

Six oz. of boiling water were poured on 4 oz. of the fresh root cut into small pieces, and suffered to remain twenty-four hours. The color of the infusion was dark reddish, with a strong herbaceous odor, of an acrid styptic taste; upon holding some of it in the mouth for a minute, it became of a thick and mucilaginous consistence, leaving an unpleasant taste.

I. Being in the habit of making use of small lizards, the *Anolis bullaris*, Daudin, as tests of the venomous qualities of plants, I took three of these animals, and gave to each a large dose of this infusion. In five minutes they all exhibited convulsive motions, having their mouths open, as if breathing with difficulty. Their posterior extremities were paralyzed, and they died in the space of fifteen minutes. I repeated this experiment on several other lizards, with the same result. The symptom which most struck me was the extreme difficulty these animals experienced in breathing during the operation of the poison.

II. I tried a very small dose on lizards of the same kind. They became stupid for the space of three quarters of an hour, and then recovered, as if they had taken nothing injurious; after frequent experiments on these lizards, and always varying the doses, I discovered that a certain quantity rendered them cataleptic. The little animals would quietly remain in the attitude in which they had been placed, until (the poison ceasing to operate on the nervous system,) they would take to flight. I then tried the following amusing experiment: stretching a silk thread on two small sticks placed perpendicularly on the table, and having four lizards, I gave to each a dose at intervals of five minutes. I then suspended each to the silk thread by one of its toe nails.

They all remained thus hanging without the slightest motion. Exactly an hour after the dose had been given, each lizard took to flight, one after the other with intervals of five minutes, precisely in the order they had taken their doses.

III. The infusion was then exhibited to birds of different species, and to frogs. In the latter, catalepsy was more easily induced than in any other instance. The effects were similar to those detailed in the preceding experiments: a very small dose producing a slight convulsion, a larger dose causing catalepsy, and death ensuing when it was still increased. It may likewise be remarked, that when these animals recovered from the cataleptic stage, the use of all their functions was completely restored. When death ensued, the following were generally the appearances on dissection.

The arachnoid membrane was slightly injected. All the blood-vessels of the lungs filled with blood. A great dilatation of the auricles and ventricles of the heart, which were filled with black blood nearly fluid. These were the only deviations which had taken place from the natural state of the parts affected.

IV. I gave to a middle-sized dog two table-spoonfuls of the infusion, which instantaneously rendered him cataleptic. He remained standing with the legs wider apart than natural, the neck also a little stiffened, the eyes fixed and vacant, the pupil much dilated, respiration nearly stopped, the pulse very feeble. I at first placed him upright with the two fore feet against the wall. In this situation, I turned his head at pleasure, and it always remained as I placed it. I next laid him on his belly, stretching his limbs as far as possible, then upon his back, and in short in almost every variety of position, however constrained or unnatural, and in all these attitudes he made not the least motion, although his limbs preserved the suppleness of the living animal. This state continued one hour, when the dog, after a slight chill, perfectly recovered.

One more phenomenon remains to be observed before I close, which is that I made several experiments with the roots of this *Passiflora*, whose stalks had been cut close to the ground, and thus kept during five months without allowing the growth of any sprouts. The infusion of these roots produced scarcely any deleterious effects. I would also add, that the leaves and buds of the *Cecropia peltata* Pers. are frequently used, when boiled, to counteract the poison of the *P. quadrangularis*.

NOTICE of several species of SHELLS. By D. H. BARNES.
Read 5th April 1824.

1. GENUS. CYPRÆA.

OBSERVATIONS.

THE natural family of the *Cyprææ* is numerous and beautiful. The generic character of *Linne* is so accurate that none of the moderns has thought it necessary essentially to alter it, or to distribute its constituents into new genera. The perfect shells are, every where, instantly recognised, and the number of species, determined by the best observations, exceeds sixty. The imperfect shells give the student, occasionally, a little trouble. Even *Linne* described more than one species, under several different names. This mistake is to be attributed to the singular changes of form, size, and color, which the shells undergo in the different stages of their growth. At first, they very much resemble a *Volute*, rolled up cylindrically, with an exserted spire and ecaudate base. They next assume the form of a *Bulla*, with no appearance of teeth on the inner lip, and very little on the outer. Lastly, the aperture is contracted, toothed on both sides, and extended the full length of the shell; the colors deepen, the polish becomes brilliant, the size is diminished, and the weight increased. Another cause of mistake, which seems hitherto to have been overlooked, in part at least, is the decortication of specimens.

I laid before the Lyceum, on a former occasion, a suite of specimens, showing that the *Cypræa lota* and *C. spurca* were the same species; the former, which are white, being the decorticated specimens of the latter, which are yellow and spotted. When this species arrives at maturity it is less than in its younger state, but more thick, solid, and extended at the base. In this state the outer coat, which contains the color, is very thin, and can easily be detached, leaving the polish nearly or quite as brilliant as before, and the shell perfectly white, except a row of impressed hollow dots round the margin, in which the original yellow remains. We have this species in every stage of the alteration, from the cracking of the yellow enamel, to the completely white specimens. It is probable that several other species, as they now stand in the books, will prove to be merely varieties of their congeners. But so long as form, color, and surface are made the distinguishing characteristics of shells, we must continue to describe separately each of those that are, in these respects, materially different. For this reason, I have determined on a new description of the two following beautiful shells. They are either undescribed, or imperfectly described in the books, and therefore require a new description, to render them intelligible. They are both oriental, and might long since have been submitted to the Lyceum, but for a desire to examine with all due care the seventh volume of the great work of Lamarck, entitled *Histoire Naturelle des Animaux sans Vertèbres*.

SPECIES.

1. CYPRÆA MACULATA. *Spotted Cowry*. Pl. IX. Fig. 1.

Shell ovate, gibbous; back chesnut with white spots; base dilated; margins thickened and spotted with dark brown.

C. testâ ovatâ, gibbosâ; dorso castaneo, maculis albis irregularibus notato: infimâ facie dilatatâ; lateribus incrassatis, atro-fusco notatis.

Length 2·2—3. **Breadth** 1·8—2. **Height** 1·25—1·5 inches.

C. Arabica. *Burrow's Elements*, pl. 14, fig. 1 ?
Lamarck's An. S. V. vol. 7, page 378 ?

“(b) Var. laterum angulo eminentiore, dorso maculis irregularibus notato.”

Inhabits the East Indies.

My collection. Presented by Mr. G. C. Dekay.

Cabinet of the Lyceum.

DESCRIPTION.

The general outline of this shell resembles that of the *Cypræa Mauritianæ*, or *Cypræa caput serpentis*, being triangularly gibbous, ovate, with the margins thickened, dilated, and angular; base somewhat flattened and slightly convex. The color on the back much resembles that of the *Cypræa Mauritianæ*; the spots are less and of a lighter color. The thickened sides are marked with dark brown spots, and there is also a large one on the centre of the pillar lip. Teeth dark brown.

REMARKS.

Burrow says that the variety described by him might, without impropriety, form a distinct species; and indeed the present shell, though larger, much more resembles *Cypræa caput serpentis*, than it does the common specimens of *Cypræa Arabica*.

2. *CYPRÆA EBURNEA*.* *Ivory Cowry*. Pl. IX. Fig. 2.

Shell smooth, white, globular; extremities beaked; outer lip crenulated above; within brown.

C. testâ lævi, nitidè albâ, globosâ; utrinque rostratâ; labro supernè crenulato; intus fuscâ.

Length 1·8. Breadth 1·13. Height 1 inch.

Inhabits the Coast of China.

Cabinet of the Lyceum.

My collection.

DESCRIPTION AND REMARKS.

Color pure snow white, on the back, sides and base; inside brown; surface smooth and highly polished. The body of the shell is ventricose, and the extremities somewhat produced. The outline resembles the *Bulla ovum* of Linnè, and the genus *Ovula* of Lamarck. I therefore conjecture that the *Cypræa ovulata* of Lamarck, is the young of this species; for, although his description is very short, it contains three characters of a young shell, viz. "Aperture very wide, teeth of the columella very small, and shell thin (mince). These three characters are not found in the present shell, and they may serve to distinguish it from the *Cypræa ovulata*, should these prove to be different species. Lamarck does not mention the beaked extremities, nor the brown inside; characters probably not apparent in the young shell. He gives the length 8·5 French lines, (12 to the French inch,) by which it appears that the present shell is more than four times as large as his *Cypræa ovulata*. This is a very beautiful shell, of which a perfect specimen is rare, though water-worn ones are not uncommon. They are of a brownish cast, and so altered in appearance, as to be known only by their size and general outline.

2. GENUS. DOLIUM. *D'Argenville, Lamarck.*

Shell thin, ventricose, inflated, often sub-globose, rarely oblong, transversely ribbed; outer lip through its whole length dentate or crenate. Aperture longitudinal, base emarginate.

BUCCINUM. *Linnè Systema Naturæ, p. 1196.*

“*§Ampullacea inflata, rotundata, tenui-subdiaphana, fragilis.*”

BUCCINUM. *Dillwyn's Recent Shells, p. 582.*

“*§Inflated, rounded, thin, slightly transparent, and brittle.*”

SPECIES.

DOLIUM DENTATUM.* *Toothed Tun. Pl. IX. Fig. 3.*

Shell ovate-globose, ventricose, imperforate, whitish flesh colored; with seventeen obtuse ribs; columella armed with a solitary and somewhat double tooth above, and furnished with two or three oblique plaits below; outer lip reflected, making an angle with the body.

D. testâ ovato-globosâ, ventricosâ, imperforatâ, albido-carneolâ; costis septemdecimis obtusis; columellâ supernè dente solitario subgeminoque armatâ, infernè plicis duabus vel tribus obliquis instructâ: labro angulato-reflexo.

Length 2·7. Breadth 2·2. Height 1·8.

Inhabits the coast of Peru. *Capt. Skiddy.*

Cabinet of the Lyceum.

Presented by *Captain Wm. Skiddy*, of the ship General Brown.

DESCRIPTION.

Shell without colored markings, glabrous, with seventeen ribs, of which the upper ones are more prominent and distant, with a small elevated line between them; spire channeled by the projection of the highest rib; inner lip expanded over the columella and thin; *outer lip* bent suddenly outward, and forming an acute angle with the body whorl, not thickened, with all the ribs passing over it to the extreme edge, which is acute and slightly bent inward; with fifteen sharp teeth on the inner angle, of which the uppermost three are double; *Columella* with a large obtuse solitary *tooth* on the upper part, a deep hollow in the middle, and two or three prominent oblique plaits below; base not umbilicated; spire pervious to the summit, as though it had been rolled round a small straight wire.

A pretty shell, which may be added as an *eighth* species to the *seven* described by *Lamarck*.

N. B. The figure of this shell is half, the others full size.

3. GENUS. NATICA. *Bruguieres, Lamarck.*

Shell sub-globose, umbilicated. Aperture entire, semi-circular. Inner lip oblique, toothless, callous: the callosity contracting and sometimes covering the umbilicus. Outer lip acute, within smooth. An operculum.

NERITA. *Linne* Sys. Nat. p. 1251. "§ *Umbilicatae*."

NERITA. *Dillwyn* Rec. Sh. p. 975. "§ *Umbilicated*."

SPECIES.

NATICA PATULA. *Sowerby.*

Shell sub-orbicular, depressed, thin, wrinkled, brown, with a white margin; *umbilicus* broad, patulous and spiral, with a pillar in the centre capped by

a flattened callus; lips joined by a very thin callosity; mouth emarginate by the penultimate whirl!

NATICA PATULA. Sowerby Zool. Jour. Vol. 1, p. 60.

side ejus descriptionem l. c. et figuram pulcherrimam.

Pl. 5. Fig. 4.

Axis .8. Conjugate diameter 1.7. Transverse 2.1 inch.

Inhabits the coast of Peru. Capt. Skiddy.

Cabinet of the Lyceum.

REMARKS.

The beautiful and rare shell here indicated was described, and the description ready for the press, when my friend, Dr. DeKay, put into my hands the London Zoological Journal, from which the first number has been lately received, in which I find an excellent figure and full description of the same. I therefore erase the specific name *Helicoides*, which I had chosen, and insert Sowerby's *Patula*, though, in my judgment, less expressive of the form of the shell than the other, which describes a conformation of the mouth so peculiar to this shell, so unusual in a *Natica*, and so much resembling the aperture of the *Helices*, that the friend above named strongly advised the constitution of a new *genus* to receive this specimen, as the genus *Helix* is, by modern naturalists, confined exclusively to land shells. I have a shell from the East Indies, which bears a strong resemblance to the *Natica patula* above described. It is perhaps that species in its full-grown and perfect state; for the thinness and fragility of the *N. patula* strongly indicate a youthful and imperfect state; especially when it is observed that the general habit of the genus *Natica*, is thick and strong. The shell to which I have alluded is of a middling thickness, between the *Natica patula* of Sowerby and the *Natica duplicata* of Say. It has the colors and general aspect of the former, and measures

Axis 1.5. Conjugate 1.9. Transverse 2.3 inches.

The mouth would also be emarginate, was it not for the large callus which covers the body whirl, and unites the two lips. I take it to be the shell indicated by *Mr. Say*, as the second variety of his *Natica duplicata*, although it is without the black line he mentions; which, I believe, is often the case with that species in its perfect state. Should the *Natica patula* prove to be *immature*, *Mr. Say* will be entitled to the priority; and however different the thin, fragil, and depressed shell may at first sight appear from our thick, solid, and elevated one, if intermediate links are found to connect them, they ought all to be denominated *Natica duplicata* of *Say*; as we have already too many species enumerated in the systems; species in the *animal organization* of which the nicest scrutiny cannot detect a difference; and it is, doubtless, upon the *animal organization* that all true distinctions must ultimately depend.

4. GENUS. VOLUTA. Lamarck.

Shell ovate, more or less ventricose; apex papillary; base emarginate, without channel. Pillar plaited; lower plaits larger and more oblique. Without a pillar lip.

OBSERVATIONS.

The Lamarckian genera *Auricula*, *Tornatella*, *Turbinella*, *Cancellaria*, *Colombella*, *Mitra*, *Marginella*, *Volvaria*, *Ancillaria* and *Oliva*, having been separated from the Linnæan genus *Voluta*, leave us but a comparatively small space in which to search for a new species of this genus. This space is subdivided into four sections:

1. *Oymbiolæ*: Ventricose, as *Voluta melo*.
2. *Muricinæ*: Oval and spinous or tuberculous, *Voluta imperialis*.
3. *Musicales*: Oval and sub-tuberculous, as *Voluta musica*.

4. *Fusoideæ*: Elongated and spindle shaped, as *Voluta rupestris*.

Linnè assumed the *plaited pillar* as the generic distinction of the *Volutes*, and this included, under the same genus, land and sea shells, and yet the Lamarckian genus *Fasciolaria*, (*Murex tulipa*,) having a plaited pillar, was included under the genus *Murex*. The shell under consideration might be arranged with the *Marginella*, on account of its having a *varix* on the outer lip, but then it so much resembles the third division of the *Volutes*, the *Musicales*, that I have assigned it a place among them; and as it is ribbed longitudinally, in the manner of the *Harp Shells*, I have denominated this

SPECIES,

VOLUTA HARPA.* Pl. IX. Fig. 4.

Shell oval, smooth, whitish flesh-color with darker bands, formed by the union of chesnut and yellow spots, longitudinally ribbed; columella with the lower three folds larger; outer lip furnished with an obtuse *varix* on the outside, and a solitary tooth within.

V. testâ ovali, lævi, albido-carneolâ, castaneis rufisque maculis seriatim transversè pictâ, longitudinaliter costatâ; apice acutâ; labro extus varice obtusâ instructo; intus unidentato; columella plicis tribus inferioribus, majoribus.

Length 1·2. Breadth ·67. Diameter ·55.

Inhabits the coast of Peru. *Capt. Skiddy*.

Cabinet of the Lyceum.

REMARKS.

A beautiful shell, and as far as I can find, unknown. It is thick and strong, has a permanent *varix* on the outer lip; and

the aperture, at the base, emarginate and even truncate. I have seen but two specimens.

(To be continued.)

OBSERVATIONS on the North American species of the GENUS RUELLIA. By Captain JOHN LE CONTE, of the United States' Army, F. L. S. &c. Read May 3d 1824.

THE genus *Ruellia*, of which so many species are enumerated in the books, appears to be chiefly confined to tropical regions. Our own country can, however, boast of a few. It is my design at present to examine these; to determine and to distinguish the true species from varieties; and to correct the errors which a want of proper attention has introduced among them.

In doing this, the number of species will be diminished. Instead of reckoning five, the number allowed by our latest writers, I shall admit but three species already known, and propose one as new, whose characters are strikingly distinct from any hitherto described. I have paid much attention to these plants, and do not hesitate to speak with confidence about them, as my observations were all made on living specimens.

I. *R. strepens*: erect; leaves ovate, lanceolate-ovate, or cuneate (that is, oval attenuated at the base), shortly petioled, entire or repand, undulate, more or less ciliate at the base, sometimes smooth, but generally with a few scattering hairs on either surface; peduncles axillary, very short, for the most part three-flowered; divisions of the calyx linear, rather shorter than the tube of the corolla, scarcely hairy; corolla subequal, lilac or white; stamina equal. 21. Varies exceedingly: the stem is sometimes hairy; the shape of the leaves is very in-

constant, as is likewise their degree of smoothness; the peduncles are sometimes one-flowered.

In a rich and open soil this plant attains the height of two feet, all its properties are developed, and a hairiness which in other cases would not be visible becomes conspicuous; on the other hand, in a hard and compact clay, it seldom exceeds six inches in height, is frequently perfectly smooth, and the stem weak and declining: in this state it is the *R. humistrata* of Michaux. I do not hesitate to refer to this species, Mr. Elliott's *R. hirsuta*. Some of the varieties I have seen exactly suit his description; but it is very remarkable that he appears never to have seen the smooth variety, which in the southern parts of Georgia, is much more common than any other.

2. *R. ciliosa* of Pursh: erect, branching, more or less hirsute; leaves petioled, oval, oblong, or oblong-lanceolate, acute, or rather obtuse, sometimes cuneate, or (as may be said) attenuated into a petiole, undulate, entire or repand, more or less ciliate; peduncles axillary, very short or none, from one to three-flowered; divisions of the calyx for the most part twice as short as the tube of the corolla, linear, hispid, ciliate with whitish hairs; corolla lilac or white, subequal; stamina equal. 2.

When this species is found in rich and shady situations, it exceeds in height the preceding, but in a dry and sterile soil it scarcely grows more than three inches high, and is even sometimes pressed to the ground; in this situation it is more hairy, and the tube of corolla (a variable character with respect to the length of the calyx) becomes much shortened. It is thus found very common in the neighbourhood of Savannah, and is the *R. hybrida* of Pursh, who obtained from me the specimens from which he made his description. The tall variety of *R. ciliosa* of the same, to my knowledge, occurs only in the savannas of the Alatomaha; it very much resembles the first, and after all, may not be distinct from it. Cultivation may determine the point. It is only found in sandy

soils, while the *R. strepens* is confined to those in which clay predominates.

3. *R. tubiflora*:* erect, rather branching, smoothish or hirsute; leaves for the most part sessile, oblong, repand or entire, undulate; peduncles axillary, short, one-flowered; divisions of the calyx linear-lanceolate (an inch in length) three times shorter than the tube of the corolla; corolla subequal, pubescent, white; stamina equal. 21. Inhabits in the savannas of the Alatomaha; is readily distinguished by the broader divisions of the calyx, and by the remarkably long tube of the corolla.

4. *R. oblongifolia*: erect, pubescent; leaves most entire, obovate and oval, nearly sessile, somewhat undulate; peduncles axillary, very short, from one to three-flowered; divisions of the calyx linear-subulate, longer than the tube of the corolla, united at the base into a shorter tube; corolla unequal, subringent, bluish, the intermediate lobe of the upper lip marked with a few purple streaks; stigma simple; stamina didynamous.

This species very little resembles the others. It might be separated from *Ruellia*, and constitute a distinct genus with more propriety than is perceptible in the many separations that have latterly been made in several other genera. The only wonder is how it has escaped our new genera manufacturers.

The *R. biflora*, of the elder botanists, is referred to this species, upon what grounds I know not. It ought to be expunged from our books, as no real description of it exists.

ACCOUNT of the discovery of a Skeleton of the MASTODON GIGANTEUM. Extracted from a Report made to the Lyceum of Natural History, by MESSRS. DEKAY, VAN RENSSELAER, and COOPER. Read May 10th, 1824.

Mr. WM. MOORE having presented to the Society a molar tooth of a Mastodon, accompanied with the information that the skeleton, to which it belonged, lay buried near the place where the tooth was found, we were induced to proceed to the spot, in order to verify the truth of this statement, and to attempt the recovery of the bones.

We found it situated three miles S.W. from Long Branch, in the county of Monmouth, state of New-Jersey, and about forty miles in a southerly direction from the city of New-York, on a farm called "Poplar," belonging to Jacob Croxson, Esq. of Eaton-town. Here we were hospitably received by Mr. W.H. Croxson, son of the proprietor. Having informed him of the object of our visit, he stated to us the manner in which he had himself made the discovery of the bones in the month of March 1823, fourteen months previous. Walking over a reclaimed marsh on his farm, about that time, his attention was caught by something sticking out of the turf. He struck it loose with his foot, and picking it up, found it to be a large grinder. He afterwards dug up two other teeth, with some fragments of the skull, the spine, the humeri and other bones. Most of these were still in his possession, and he accordingly showed them to us. The sight of these increased our impatience to examine the spot where they were found. Mr. Croxson therefore immediately conducted us thither.

Poplar Farm is about two miles from the sea-beach. The face of the country in the vicinity is generally level; but between this farm and the sea it swells gently into a low and broad ridge, running for some distance parallel with the sea-coast. At Poplar this elevated tract slopes down very gradu-

ally on its western side into a marsh, now cleared of its forests and intersected by ditches, so that it is at certain seasons nearly dry. Formerly it is said to have been very watery, and to have abounded with a species of poplar, whence the farm derived its name. Not far from the border of this marsh, we found a shallow excavation with a little water standing in the pit where the left fore-leg had been taken, and perceived several broken vertebræ and fragments of other bones lying scattered and bleaching on the surrounding turf. Here, with the permission of the owner of the land, we immediately began to explore, and, in the course of that and the following day, succeeded in procuring, with the assistance of some gentlemen who had accompanied us, all the remainder of the bones that were still undecomposed. These we have now the pleasure to present to the Society. Together with those first taken up by Mr. Croxson, and of which he has recently, with great liberality, made a donation to our cabinet, they comprise nearly one entire skeleton. Possessing already, through the enterprise of two of our associates, part of another skeleton from Chester, in this State, in which are several important bones wanting in that from New-Jersey, particularly the lower jaw, the collection of the Lyceum now affords unusual facilities for studying the osteology of this great quadruped.

The researches of Cuvier, in collecting all that was known relative to the great Mastodon, and in digesting these materials into one connected history, enriched as it is with his own invaluable remarks, have left little for future observers to add. The only important part of the skeleton which has never been described, is the upper part of the cranium. All attempts to procure this entire have hitherto proved fruitless, nor did we experience better fortune in this respect than former adventurers. It would, therefore, be unnecessary on the present occasion to enter into anatomical details; but it will not be considered useless or unimportant to note the posture in which

The animal seemed to have been placed at the moment of the catastrophe which overwhelmed all his race. A careful observation of such circumstances, in a number of instances, may lead to important inductions, and greatly tend to elucidate the history of those convulsions which have destroyed entire species of numerous and formidable animals. For this purpose, we shall describe the appearance of the bones as they were laid bare by the removal of the surrounding soil.

This was a stratum of what is, by the German geologists, called *geest*, that is, a black, soft, shining earth, abounding near the surface in vegetable roots and fibres. Before the time of our visit, the skull, broken into many fragments, as well as the greater part of the spine, most of the ribs, both scapulæ, left radius, ulna, and the humerus of the right arm, had been removed. Of the situation of these, therefore, we cannot speak from our own observation; but Mr. Croxson informed us, that as before mentioned, part of the head had protruded itself through the surface of the ground. In consequence probably of this, it was so much decayed that he could find but three of the teeth, and no trace whatever of the tusks, nor was the search, which we afterwards made, for these latter, more effectual. The vertebral column, with all its joints and the ribs attached to them in their natural position, lay about eight or ten inches below the surface. The scapulæ rested upon the heads of the humeri, and these in a vertical position upon the bones of the fore-arm as in life. We found the right fore-arm still buried. It inclined a little backwards, and the foot, which was immediately below it, was placed a little in advance of the other, as it would be if the animal had been walking. At the depth of about ten inches, and immediately below the matting of turf which forms the surface of the meadow, we came to the sacrum, with the pelvis remaining united to it, though in a very decayed state. The femora lay adjoining, but, unlike the bones of the fore-legs, in a position nearly horizontal, the right less so than the left, and both at right angles

with the spine. These were also, from their proximity to the surface, much decayed, so that the left fell to pieces on being lifted from its bed. Both tibiae, each with its fibula, stood nearly erect under the extremities of the femora, and under them the bones of both hind-feet in their proper relative position. We found no caudal vertebrae.

The marsh had been cleared and drained about three years, and during that period, as the proprietor informed us, the level of its surface had lowered about two feet. To this may have, perhaps, been owing the horizontal position of the thigh bones, which would naturally be forced out of their originally erect position by the pressure of the heavy superincumbent bed of turf. The bones of the fore-legs do not, however, appear to have been thus acted upon.

Cuvier states,* on the authority of General Collaud, that the bones of Mastodons, formerly discovered in boggy ground near the Great Osage river, were almost all in a vertical position, as if the animals had merely sunk in the mud. The same idea suggested itself to us on beholding the appearance presented by our skeleton, after the earth was removed from around it.

The deeper we penetrated, the sounder we found the bones, so that those of the foot, lying lowest, were obtained in a state of perfect preservation.

The greater part of the bones had, adhering to their surface, and in their cavities, the phosphats of iron and lime, and the sulphat of lime in very small quantities, the last in minute crystals. There were also considerable masses of oxyd of iron or bog ore, which, however, abounded in various places in the marsh.

Immediately underlying the stratum of black earth we came to another of sand, having a ferruginous tinge, and containing numerous rolled quartz pebbles. Upon this sandy stratum

* *Ossements Fossiles*. Ed. 2. tom. 1. pp. 217 & 222.

the skeleton seemed to stand, so that though the upper side of the foot was covered by the black earth, the sole rested immediately upon the sand. We found all the feet placed thus, the surface of the sandy stratum being apparently quite level.

This sand formation resembled, in all respects, that which we had before observed lying next above the marly strata ; into which, in numerous places in the adjacent county, deep excavations have been made, in order to obtain the marl for agricultural purposes. If this conjecture be right, we should have the following succession of strata.

1. The black earth, containing the remains of the great Mastodon. About eight feet thick.

2. Silicious sand with rolled pebbles. Thickness unequal, but generally greater than that of the black earth.

3. Marl formation, almost exclusively composed of the debris of testaceous animals. These appear to have been principally bivalve shells, though a few univalves are sometimes found. This formation appears to vary in thickness at different places from ten to thirty feet. Perhaps it should be considered as composed of several strata, characterized by different species or genera of shells. Thus we observed one stratum wholly composed of a species of *ostrea*, which was constantly elevated several feet higher than another which contained only the shells of a different species. A fossil elephant's tooth is likewise stated to have been found in a marl pit in this county.*

We were not able to determine the character of the stratum underlying the marl.

* Appendix to Cuvier's Theory of the Earth. N. Y. Ed.

DESCRIPTIONS of some new GRASSES collected by Dr. E. JAMES, in the expedition of Major LONG to the Rocky Mountains, in 1819—1820. By JOHN TORREY. Read May 17th, 1824.

In a former part of this volume, I commenced an account of the alpine plants collected in this expedition, by Dr. James, which I promised to continue, in occasional decades. Having been obliged, for the present, to defer the examination of the remaining specimens, I beg leave to offer to the Lyceum descriptions of some new grasses, collected by Dr. James in the same expedition. Their number might have been considerably increased had not many of them been discovered a short time previous, by Mr. Nuttall, in his Travels into the Arkansas Territory. One species, of which there were very perfect specimens, in the herbarium of Dr. James, is so peculiar that I have proposed it as the type of a new genus, under the name of *Pleuraphis*.

PLEURAPHIS.*








GEN. CH. *Flowers* spiked, heterogamous. *Spikelets* three at each joint of the *rachis*, all sessile, surrounded at the base by a villous *involucrum*. CENTRAL SPIKELET perfect. *Calyx* two-glumed, one-flowered; *glumes* obcuneate, two-cleft, five-bristled. *Corolla* two-valved, hyaline; inferior valve with a short *bristle*. LATERAL SPIKELETS antheriferous. *Calyx* two-glumed, two-flowered; inferior glume with a *bristle* on one side near the base. *Corolla* two-valved, unarmed.

1. P. JAMESII.* PL. X.

DESCRIPTION.

Root perennial, creeping.

Stem caespitose at the base, about a foot high, terete, smooth, slender.

-  *Leaves* narrow, convolutely setaceous, rigid, glaucous, deeply striate, scabrous; those on the culm short and pungent.
-  *Sheaths* shorter than the joints, closely embracing the culm, hairy at the throat, striate, glaucous and a little scabrous.
-  *Tipule* finely laciniated and bearded.
-  *Spike* terminal, about three inches long, erect.
-  *Rachis* articulated, filiform, angular, flexuous, naked.
-  *Spikelets* sessile, in an ovate congeries at each joint of the rachis, polygamous, surrounded at the base by a white woolly *involucrum* one-third the length of the flowers.
-  *Central spikelet* perfect.

Calyx two-glumed, one-flowered; *glumes* obcuneate, herbaceo-coriaceous, equal, deeply two-cleft, carinate, ciliate on the margin, armed between the divisions with five scabrous *bristles*, the middle ones of which are nearly as long as the glumes, the others shorter.

Corolla two-valved; valves membranaceous, lanceolate; the inferior a little longer, somewhat hairy on the upper part of the sides and margin, with three indistinct nerves, the middle one of which is produced into a short *cuspid*; superior valve reverse, a little bifid at the apex, two-nerved.

Stamens three; *filaments* very short; *anthers* large, linear, yellow.

Pistil: *Germen* ovate; *styles* two, distinct, approximated, filiform; *stigmas* elongated, simply plumose, yellow.

Nectaries collateral, linear, entire.

Lateral spikelets antheriferous.

Calyx unequal, two-glumed; inferior glume a little shorter, lanceolate, acute, entire; one of the margins involute and armed with a straight scabrous bristle about half way down; the other margin ciliate; superior glume mucronate, ciliate on the upper part, three-nerved; one of the lateral nerves strong and continued beyond the valve into a short point, ciliate.

Corolla two-valved; inferior valve ovate-lanceolate, toothed at the apex, three-nerved; superior valve sub-
 bicarinate, two-nerved, 2—4-toothed at the tip.

Stamens three; *anthers* linear, yellow.

HAB. On the high plains of the Trap Formation at the sources of the Canadian River. July.

This genus resembles, in many respects, the *ÆGROGON* of Humboldt and Bonpland, but is still very distinct. In the latter, the spikelets are pedicellate and similar in structure; the only difference being that of sex: while in the *PLEURAPHIS* they are sessile, and the central spikelet different from the rest. The *ÆGROGON* is also destitute of a villous involucre, which is very conspicuous in the *PLEURAPHIS*. One of the most remarkable characters of our new genus (from which the name is derived) is to be found in the calyx of the lateral spikelets, one of the glumes of which is armed with a pretty long bristle proceeding from its side, a circumstance which I have not observed in any other grass. In the elaborate *Agrostographia* of P. de Beauvois there is no genus to which I can refer this grass, nor is it to be found in the more recent work of Trinius, on the Gramina.

Explanation of the plate.

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|---|-----------------------------------|
| <i>Fig. 1.</i> A plant of the natural size. | <i>Fig. 11.</i> Central spikelet. |
| 2. A congeries of spikelets. | 12. The same magnified. |
| 3. The same separated. | 13—14. Glumes of the same |
| 4. A lateral spikelet. | 15. Corolla. |
| 5. The same magnified. | 16. Inferior valve of the same. |
| 6—7. Glumes of the same. | 17. Superior valve. |
| 8. Corolla. | 18. Stamens. |
| 9. Inferior valve of the same. | 19. Germen, styles, and stigmas. |
| 10. Stamens. | 20. Nectaries. |

2. AGROSTIS CRYPTANDRA.*

Panicle pyramidal, with spreading subalternate branches, **hairy** at the axils; flowers racemose, unarmed; inferior valve of the calyx very short; superior as long as the sub-equal corolla; sheaths bearded at the throat.

DESCRIPTION.

Culm 3 feet high, simple, smooth, leafy, with distant joints. **Leaves** linear, 2—3 lines broad, smooth on both sides. **Sheaths** smooth, closed, longer than the joints, a little swollen with concealed abortive panicles, hairy on the margin, densely bearded at the throat. **Stipule** a mere bearded ring.

Panicle large, pyramidal, bursting from the upper sheath, which partly conceals its base; branches spreading, mostly alternate, nearly simple, bearded at the base, which is a little thickened. **Flowers** disposed in a dense racemose manner, purplish.

Calyx two-glumed, smooth; inferior glume scarcely one-third as long as the superior, very acute; superior linear-lanceolate, acute, one-nerved.

Corolla two-valved, nearly equal, about as long as the superior glume, slightly scabrous; valves one-nerved.

Stamens three; **anthers** yellowish, exserted.

Styles two; **stigmas** white, plumose.

Seed ovate, brown, smooth.

Nectaries collateral, lanceolate, entire.

HAB. On the Canadian river.

3. AGROSTIS AIROIDES.*

Panicle pyramidal, with the branches spreading and somewhat in pairs, naked at the axils; flowers solitary, unarmed;

glumes unequal, mostly shorter than the sub-equal corolla ; sheaths bearded at the throat.

DESCRIPTION.*

Root perennial, creeping?

Culm 2—3 feet high, with a few short branches at the base, leafy.

Leaves linear, 2—3 lines broad, smooth on both sides. *Sheaths* smooth, without including flowers, slightly bearded at the throat. *Stipule* an obsolete ring.

Panicle large, pyramidal, free at the base ; lower branches in pairs, or ternate ; the upper ones alternate. *Flowers* all on distinct pedicels, purplish, oblong.

Calyx two-glumed ; glumes unequal, mostly shorter than the corolla ; inferior lanceolate acute ; superior oblong, rather obtuse, one-nerved, smooth.

Corolla two-valved, smooth, awnless ; valves sub-equal, acute.

Stamens three ; *anthers* purplish, exserted.

Seed roundish, brown.

HAB. On the branches of the Arkansas, near the Rocky Mountains.

4. *AGROSTIS CAESPITOSA*.*

Cespitose ; culm branched, somewhat incurved ; leaves involute, sub-distichous, pungent ; panicle contracted ; flowers awned.

DESCRIPTION.

Root perennial, creeping?

Culm densely cespitose, 3—4 inches high, branched from the base, incurved, very leafy, smooth.

Leaves three-fourths of an inch long, subulate-involute, disposed in a distichous manner, spreading, rigid and pungent,

smooth. *Sheaths* imbricate-carinate, smooth, deeply striate. *Stipule* scarious, elongated and bifid.

Panicle about an inch long, partly sheathed at the base, contracted; branches alternate, sub-simple, flexuous; pedicels incrassated upward; flowers purplish, linear-lanceolate.

Alar two-glumed; glumes sub-equal, a little longer than the corolla, linear-lanceolate, attenuated into short bristles, or cuspidate, smooth.

Rolla two-valved, naked at the base, a little scabrous; the inferior valve terminating in an awn longer than the flower.

Stems three.

AB. On the plains of the Missouri and Platt rivers.

Plant whitish. It resembles *A. pungens* and *maritima*, but differs entirely in its awned flowers.

5. ANDROPOGON GLAUCUM.*

Smooth, glaucous; culm sub-simple; nodes smooth; panicle terminal, much exsert, oblong; spikes alternate, crowded; awns long, twisted; abortive floret neuter, unarmed, one-valved.

DESCRIPTION.

Culm two feet and more in height, nearly simple, very smooth.

Leaves broad-linear; those on the culm about six inches long, very smooth on both sides, and of a glaucous hue. *Sheaths* nerved, shorter than the joints. *Stipule* obsolete.

Panicle on a long peduncle proceeding from the uppermost sheath, 4—5 inches long, rather compact; spikes simple or branched, alternate; rachis very villous.

PERFECT FL. *Cal.* two-glumed, somewhat hairy; glumes acute, entire; the inferior hairy towards the base; superior naked.

Cor. two-valved, shorter than the calyx; inferior valve terminating in a slightly contorted awn three times its length.

Stamens ———.

Styles two; *stigmas* plumose, purple.

ABORTIVE FL. on a distichously bearded pedicel, minute, one-valved, awnless; sometimes with the rudiment of a superior valve.

HAB. On the Canadian river.

This species is allied to *ERIANTHUS*, and is remarkable for its whitish and very villous flowers. It much resembles an anonymous species figured by P. de Beauvois, *Agrostograph.* t. 23. f. 3.

6. *TRisetum AIROIDES.* *P. de Beauvois.*

Paniculâ subspicatâ, aristâ demum reflexâ, calycem excedente. *Roem. and Schult. Syst. Veg.* II. p. 666. *AIRA subspicata* L. *Willd. Spec. pl.* I. p. 337. *Fl. dan.* t. 228.

HAB. On the Rocky Mountains.

I have compared this with European specimens from Sweden and Germany, and find them to agree in every respect. It has not hitherto been recorded as an American plant, though I have received specimens of it from Dr. Bigelow, collected on the White Hills of New-Hampshire.

7. *ARISTIDA FASCICULATA.**

Culm filiform, erect, branched; leaves narrow, flat, smooth; panicle elongated, sub-spiked; flowers fasciculate; calyx shorter than the corolla; awns nearly equal, spreading, longer than the flower.

DESCRIPTION.

Culm two feet and more in height, smooth, terete, with short branches, slightly geniculate.

Leaves long, very narrow, almost filiform at the extremity.

Sheaths smooth. *Stipule* a bearded ring.

Panicle 6—8 inches long, erect, many-flowered; flowers purplish, closely approximate on the extremity of the branches.

Calyx two-glumed; glumes very unequal, linear-lanceolate, acute, carinate; the inferior much shorter than the corolla; superior about as long as the corolla.

Corolla on a short bearded stipe, two-valved, sub-cylindric, scabrous; inferior valve involute, half an inch long; *awns* longer than the flower, spreading, filiform, scabrous.

Stamens three; *anthers* purplish.

Germens linear, elongated; *stigmas* plumose.

HAB. In forests of the Canadian river.

This species is nearly allied to *A. purpurascens* of Poiret, but is distinguished by its branched culm, its short calyx, and by its shorter awns.

8. UNIOLA? STRICTA.*

Very smooth; leaves narrow, erect; panicle erect, contracted; spikelets linear-oblong, many-flowered; flowers straight, awnless.

DESCRIPTION.

Root perennial, creeping?

Culm a foot or more high, erect, rather slender, terete, with short branches at the base, smooth and shining, leafy.

Leaves 3—6 inches long, linear, flat, attenuated at the extremity, very smooth near the base, except a slight hairiness on the upper surface, somewhat glaucous, finely striate. *Sheaths* about as long as the joints. *Stipule* nearly obsolete.

Panicle nearly simple, contracted, consisting of 6—10 large spikelets. *Spikelets* three-fourths of an inch long, lanceolate, compressed and sub-ancipital, 10—18-flowered.

Calyx two-glumed, much shorter than the spikelets ; glumes unequal, lanceolate, acute.

Corolla two-valved, nearly equal, smooth and naked at the base, deciduous, awnless ; inferior valve lanceolate, acute, not mucronate, nerveless, somewhat carinate towards the extremity ; superior valve bi-carinate, acute.

Stamens three ; *anthers* yellowish.

HAB. On the shores of the Canadian river.

This species belongs, perhaps, to the genus *CERATOCHLOA* of P. de Beauvois, but the corolla is not mucronate. It appears to be intermediate between *FESTUCA* and *UNIOLA*. I could find no traces of pistils in the specimen I examined, so that the plant appears to be dioecious or polygamous.

ON the *HIRUNDO FULVA* of VEILLOT, with some general remarks on the birds of this genus. By DEWITT CLINTON.
Read August 9th 1824.

THE hirundine race, though not generally used for food, nor distinguished for melody of song or beauty of plumage, have ever held a high rank in the estimation of mankind. Swallows are considered among the swiftest of the winged tribe. "True hope," says Shakespear, "is swift, and flies with swallows' wings." These birds generally delight in associating with man. They erect their nests in his buildings or in his vicinity ; they defend his poultry against the depredations of birds of prey ; and they destroy noxious insects that infest his plantations. They are, in all respects, innocent, and the accusation of Virgil,* that they destroy bees, is known to be unfounded, doth in this country and in Europe.

* Georgic IV.

In Greece and Italy, they generally make their appearance about the vernal Equinox ; and being the harbingers and companions of spring, are identified with its beauties and delights. Horace, in an Epistle to Mæcenas, promises to leave his winter retirement in due season.

———— Te dulcis amice, reviset
Cum Zephyris, si concedes, et hirundine prima.

The time of its coming regulated the important operations of husbandry. Hesiod, in his "Works and Days," inculcates early attention to the pruning of the vine, and says

———— 'Tis dangerous to delay,
Till with complaints the swallow breaks the day.

The intimate connexion between the vegetation of plants and the arrival of certain birds, has long been observed. Dr. Barton says that the woodcock visits Philadelphia when the *Anemone nemorosa* is in blossom. Linnè observed that the *Anemone nemorosa* blows in Sweden on the arrival of the common swallow ; and the appearance of the Pewee, Pewit, or Phebe, *Muscicapa nunciola*, with us is the signal of the cessation of severe frosts. The arrival of the swallow was considered an indication of spring ; and the subsequent evolutions of this bird were noticed as prognostics of the weather. Virgil says,

—— Nunquam imprudentibus imber
Obsint —————
Aut arguta lacus circumvolitavit Hirundo.

In almost all countries, whatever may be the climate, the swallow is a migratory bird. Herodotus, indeed, excepts Egypt, and says that swallows and kites never emigrate from the country through which the Nile passes, and the same has been said of Japan. Being an insectivorous animal, its migrations do not depend on climate, but have generally been

connected with its food. The periodical appearance of this bird, at the most propitious season of the year, has greatly enhanced its importance. The Rhodians had a solemn song to welcome its arrival; and Ælian declares that it was consecrated to the Penates or household gods of the ancients, and protected from molestation.

The mystery, which has surrounded the brumal retreat of this bird, has also added to its celebrity. Some have assigned to it winter quarters in the moon; others have designated its hybernaculum in invisible satellites closer to the earth. Aristotle and Pliny have placed it in warm and sequestered places. Olaus Magnus and Kircher have sent it to the bottom of lakes and rivers; and even in our own times, reputable men, laboring under optical delusion, have declared that they have witnessed its descent into the Hudson and the pond on Manhattan island, called the Collect. All these speculations and conjectures have yielded to the doctrine of emigration. Like all other migrating birds, the swallow congregates in flocks at the time of its departure, and probably ascends out of sight on its transit.

In Turton's edition of Linnè, thirty-eight species of *Hirundo* are enumerated. Thirty-four with three toes before and one behind, and four with the toes all placed forward.

Of those 8 are assigned to different parts of Europe.

- 8 to Asia,
- 12 to South America,
- 4 to Africa,
- 4 to North America, and
- 2 to the West Indies.

Two of the above that are allotted to Europe are also represented as belonging to North America. Two also to Asia, and one to both Americas.

In England, there are but four species of *Hirundo*. In this State, there are six or seven. Five are described in Wilson's Ornithology.

1. *H. americana*: Barn swallow, seven inches long. This is the *H. rufa* of Veillot, and perhaps of Latham and Gmelin. The *H. Americana* of Gm. is a different bird.

2. *H. viridis*: Green, blue, or white-bellied swallow, five and three-quarters inches long. It is the *H. bicolor* of Veillot. In addition to these two names, Mr. Stevens (in Shaw's Zoology) has given a third, *H. leucogaster*, to the same bird, at the same time quoting by mistake Wilson's name as *bicolor*. As this name was pre-occupied, he thought it necessary to change it, although a slight comparison of the figures and descriptions would have convinced him that they belong to one and the same species.

3. *H. riparia*: The bank swallow, or sand martin, five inches long. This is, perhaps, the only swallow that can be claimed by the Old World, and even about this, there are conflicting opinions.

4. *H. pelagica*: Chimney swallow, four and a half inches long. This bird differs remarkably from its congeners in the feet and tail, and has been removed by Temminck to the genus *Cypselus* of Illiger. It, however, does not strictly agree with either this genus, or *Hirundo*.

5. *H. purpurea*: Purple martin, eight inches long. The name *purpurea* was given by Linnè to the male of this bird; the female he describes as a separate species under the name of *H. subis*. The Canada swallow of Latham, the great American martin of Edwards, and the *H. violacea* of Gmelin, are in reality the same bird as the purple martin. Veillot, who quotes all these synonyms, has increased the confusion, by bestowing still another name on this bird; it is his *H. cærulea*. Dr. Barton has erroneously taken it for the *Tapera* of Brazil, or the *H. tapera* of Gmelin.

Besides these, Veillot assures us that the *H. rustica*, or chimney swallow, of Europe, inhabits also the United States. He states that he has several times met with them, and that at New-York they are confounded with the *H. rufa* (*Americana*,

Wils.), under the name of barn swallow. I am told that a strange swallow has made its appearance in Easton, at Pennsylvania, and makes its nest in chimnies. If this statement is correct, this bird may prove to be the *H. rustica*, which is said in the Sys. Nat. to inhabit "per omnem orbem terrarum."

The tails of these birds are all furcated, except the chimney swallow's, *H. pelagica*, which is pointed with shafts. The *H. viridis* has not been observed in many places. When noticed as a distinct bird, it has been called the tree swallow, and it is said to build its nest in trees, or in martins' cages. Mr. Thomas Browne, an intelligent gentleman of Chenango county, informs me that it is supposed to make its nest in the holes formed in banks by king-fishers.

It is not improbable, however, that Hirundines may exist with us, which have never been particularly observed as distinct species. The rapid flight of the swallow eludes minute observation; and I have sometimes thought that I have seen strange swallows, particularly flying about the Mohawk river, east of Utica.

The swallow which forms more especially the subject of this communication, first made its appearance at Winchell's tavern, on the high road about five miles south of White-Hall, near Lake Champlain, and erected its nest under the eaves of an out-house, where it was covered by the projection of the roof. This was in 1817, and in this year there was but one nest; the second year, seven; the third, twenty-eight; the fourth, forty; and in 1822, there were seventy, and the number has since continued to increase. It has extended itself to Fort Miller, Ballston, Franklin in Delaware county, Newport in Kentucky, Red Bank in Ohio, and perhaps still further, for a species nearly allied to this, possibly the same, was seen on the 18th of July, 1820, by Major Long's party, near the Rocky Mountains, where it abounds. It is described by Mr. Say, in the account of that expedition, under the name of *H. lunifrons*. It ap-

peared in 1822 at Winchells on the 5th of June, and departed on the 25th of July; and these are the usual times of its arrival and disappearance.

This is an active lively bird, continually flying, and frequently sailing like the martin, *H. purpurea*, without any visible exertion of the wing. Its twittering is different from that of any other swallow, and it seeks its food in the same places without any apparent collision.

On account of the size, form, dimensions, and rapid construction of its nest, I had supposed it to be a new species, and had named it the Artificer, *Hirundo opifex*. I have since, however, found it figured and accurately described under the name of *Hirundo fulva*, by M. Vieillot, in his splendid work, entitled, *Histoire Naturelle des Oiseaux d'Amerique Septentrionale*, published at Paris in 1807.

M. Vieillot's account of it, however, is very imperfect. He saw it but once at St. Domingo, in the middle of May, in a flock of about sixty. He likewise saw specimens brought by Boug  from Porto Rico, where the latter had also met with it in the spring. He conjectures from its having been thus observed at the same season in two different years, that it is a bird of passage in the West Indies, and passes on to the north to build. He adds, that he had never seen it in the United States, but that being once in the month of August, near the latitude of Halifax, Nova Scotia, several of these swallows came and alighted on the yards of the vessel in which he was. Having never met with them when ashore, he presumes that they had set out from the south, and came from a country still farther north.

This conjecture respecting their breeding place, now proves from what has been related above, to be correct. His figure is inaccurate; the tail being there represented very acutely forked, and the colour of the head and back a clear blue. His description is, however, much more exact, and though he does not mention whether the tail is even or forked, there

can be no doubt of his bird being identical with the species which I shall proceed to describe.

Length from 5 to 5½ inches; *bill* brownish black;* *upper part of the head* purplish blue; *upper part of the neck* has a streak of yellowish brown; *back* light purplish blue, intermixed with white; *tail* coverts a little lighter; *frontlet* and *rump* yellowish brown; *upper-wing coverts* the same colour as the tail coverts; *chin* ferruginous; *belly, vent, and lining of the wings*, wood brown; *wings* and *tail* hair brown; *tail* very slightly forked; *tips of the wings* extending, when folded, about a line beyond the tail; *legs* of a hair brown colour; *eyes* black; *toes* three before and one behind. Lays generally four eggs.

Cabinet of the Lyceum.

The nest is hemispherical: six inches long and five broad; constructed with mud or clay, and sand combined: no hair or sticks to make the materials cohesive; the inside is softened by grass broken fine and deposited on the clay. The external surface of the nest is somewhat of a botryoidal aspect, exhibiting small pieces of clay in rounded masses, and the aperture turns down like the neck of a chemical retort. It was placed under the eaves of a building where it was protected from the weather. This fabric has been erected in three days.

This bird, as well as the *H. lunifrons*, has some resemblance in its mode of nidification, to the Crag swallow (*H. montana*) of Savoy and France. It differs from the *H. lunifrons*, in having the tubular entrance at the bottom, instead of the top of the nest, a difference which, however, may be owing to circumstances, and not characteristic of the species. It is very much like the *H. Davurica* or *Davurian* swallow, of the Alpine parts of Siberia. The hemispherical nest in the cliffs is similar, and also the general outlines of the birds, but the

* I have followed, "Werner's Nomenclature of Colours," by P. Syme. Falin. 1814.

latter is well distinguished by having the outer tail feather on each side twice as long as the rest.

There are numerous mountains in the vicinity of the place where these birds first appeared, and from which they may have migrated to the habitations of man. They have certainly not been long known as residents in this region. The yellowish brown rump distinguishes them very obviously when on the wing from other *Hirundines*, and the construction of their nests exhibit a difference palpable to the most common observation.

The history of this swallow is certainly curious, and its appearance at different places and at different periods, goes to show that it is a stranger which has taken up its residence among us, increasing in numbers and extending its columns.

I cannot close without observing that all our swallows, except the sand martin, have selected our houses and out-houses for nidification and temporary habitation, and the benefit we derive from the consequent destruction of annoying and pernicious insects, must be very extensive.

NOTE. Since the preceding was in type, Mr. Audubon,* has favoured the Lyceum with the following additional information respecting this remarkable species.

In the spring of 1815, I saw a few of these birds for the first time at Henderson, 120 miles below the falls of the Ohio, on the banks of that river. It was an excessively cold morning in the month of March, and nearly all were killed by the

* This gentleman, with an enthusiasm only equalled by that of our lamented Wilson, has devoted nearly twenty years to the study of American Ornithology. He has followed the birds into their most secret haunts, and traversed the United States in almost every direction. To the learning of a naturalist, he unites the skill of an artist, and his magnificent collection of drawings, representing four hundred species, excels any thing of the kind in this country, and has probably never been surpassed in Europe.—*Conn. Pub.*

severity of the weather. I drew up at the time a description under the name of *H. Republican*, *Republican swallow*, in allusion to their mode of association for the purposes of building and rearing their young. Unfortunately, the specimens, through the carelessness of my assistant, were lost, and I despaired for years of meeting with them again.

In the year 1819, my hopes were revived by Mr. Robert Best, curator of the Western Cincinnati Museum, who informed me that a strange species of bird had appeared, building nests in clusters affixed to walls, which I immediately recognised as the Republican swallow.

In consequence of this information, I immediately crossed the Ohio, to Newport in Kentucky, where he had seen those nests the preceding season, and no sooner were we landed, than the chirrups of my long-lost little strangers saluted my ear. Numbers of them were busily engaged in repairing the damages done to their nests by the storms of the preceding winter.

Major Oldham, of the United States Army, then commandant of the garrison, politely afforded us the means of examining the settlement of these birds, attached to the walls of the buildings under his charge. He informed us, that in 1815 he first saw a few of these birds working against the wall of the house, immediately under the eaves and cornice; that their work was carried on rapidly and peaceably, and that as soon as the young were able to travel, they all departed. Since that period, every spring has brought them and their increase, amounting now to several hundreds. They usually appear about the tenth of April, and immediately begin their work, which was at that moment, April twentieth, progressing in a workmanlike manner, against the walls of the arsenal. They had about fifty nests quite finished, and others in course of construction.

About daylight they fly down to the river shore, one hundred yards distant, for the muddy sand, of which their nest is com-

posed, and work with great perseverance until near the middle of the day, as if aware that the heat of the sun was necessary to dry and harden their moist tenements; they then cease from labour for a few hours; amuse themselves by performing aerial evolutions, court and caress their mates with much affection, and snap flies and insects on the wing. They often examine their nests to determine whether they are sufficiently dry, and as soon as they appear of the requisite firmness, their labours are immediately renewed. Until the females began sitting, they all roosted in the hollow limbs of the sycamore, *Platanus occidentalis*, growing on the banks of the Licking river, and when incubation commenced, the males alone occupied the trees. A second party arrived, and were so hard pressed for time, that they betook themselves to the holes in the wall, where bricks had been left out for the scaffolding; these they closed with projecting necks similar to the complete nests of the others. Their eggs are deposited on a few bits of straw, and great caution was necessary to obtain them, as the slightest touch would crumble their frail tenement into dust. By means of a table-spoon, I was enabled to examine and procure many. Each nest contained four eggs, white, with dusky brown spots. Only one brood is raised in a season.

The energy with which they defended their nests was truly astonishing. Although I had taken the precaution to visit their nests at sunset, when I had supposed they would all have been on the sycamores, yet a single female happened to be sitting, and she gave the alarm which immediately called out the whole tribe. They snapped at my hat, my body, and my legs, passed between me and the nests within an inch of my face, twittering their rage and sorrow. They continued their attacks as I descended, and accompanied me some distance. Their note may be perfectly imitated by rubbing a cork dampened with spirit, around in the neck of a bottle.

A third party arrived a few days after, and immediately commenced building. This was completed in one week; at the end of which time, thirty nests hung clustered like so many gourds, each having a neck two inches in length, for the admission of the bird.

On the 27th of July, the young were able to follow their parents. They all exhibited the white frontlet, and were scarcely distinguishable in any part of the plumage from the old birds. On the 1st of August they all assembled near their nests, mounted about three hundred feet in the air, and at 10'oclock in the morning they vanished, flying in a loose general body, in a due north direction. They returned the same evening about dusk, and continued these excursions, no doubt to exercise their powers, until the 3d, when uttering a farewell cry, they shaped the same course at the same hour, and finally disappeared.

Shortly after their departure, I was informed that several hundreds of their nests were attached to the court-house, at the mouth of the Kentucky river. They had commenced building them in 1815. A person likewise informed me, that along the cliffs of the Kentucky, he had seen many *bunches* as he termed them, of these nests, attached to the naked shelving rocks overhanging that river.

FACTS and Observations connected with the permanent residence of SWALLOWS in the United States. By JOHN I. AUDUBON. Read August 11th 1824.

BEING extremely desirous of settling the long agitated question, respecting the emigration or supposed torpidity of the swallow, I embraced every opportunity of examining their habits, of carefully noting their arrival and disappearance, and of recording every fact connected with their

history. After some years of reflection and constant observation, I remarked that among all the species of migratory birds, those that remove farthest from us, depart sooner than those which retire only to the confines of the United States, and by a parity of reasoning, those that remain later, return earlier in in the spring.

These remarks were confirmed, as I advanced towards the south-west on the approach of winter, as I there found great numbers of Warblers, Thrushes, &c. in full feather and song. It was also remarked, that the *Hirundo viridis* of Wilson, (called by the French of lower Louisiana *le petit martinet à ventre blanc*) remained about the city of New-Orleans later than any other swallow. As immense numbers of them were seen during the month of November, I kept a diary of the temperature from the third of that month, until the arrival of the *Hirundo purpurea*.

The following notes are taken from my journal, and as I had fair opportunities during a residence of three years in that country, of visiting the lakes to which these swallows resort during the transient frosts, I present them with confidence to the Lyceum.

November 11th, weather extremely sharp, with a heavy white frost; swallows in abundance during the whole day. On inquiry of the inhabitants if this was a usual occurrence, I was answered in the affirmative by all the French and Spaniards. From this date to the 22nd, the thermometer averaged 65°, the weather generally a drizzly fog. Swallows playing over the city in thousands.

November 25th. Thermometer this morning at 30°. Ice in New-Orleans a quarter of an inch thick. The swallows resorted to the lee of the cypress swamp in the rear of the city. Thousands were flying in different flocks. Fourteen were killed at a single shot, all in perfect plumage and very fat. The markets were abundantly supplied with these tender, juicy, and delicious birds. Saw swallows every day, but re-

marked them more plentiful, the stronger the breeze blew from the sea.

December 20th. The weather continued much the same. Foggy and drizzly mist. Thermometer averaging 63° .

January 14th. Thermometer at 42° , weather continues the same; my little favourites constantly in view.

January 28th. Thermometer at 40 . Having seen the *H. viridis* continually, and the *H. purpurea*, or purple martin, beginning to appear, I discontinued my observations.

During the whole winter many of them retired to the holes about the houses, but the greater number resorted to the lakes, and spent the night among the branches of the *myrica cerifera* L. or *cirier*, as it is termed by the French settlers. About sunset they began to flock together, calling to each other for that purpose, and in a short time presented the appearance of clouds moving towards the lakes or the mouths of the Mississippi, as the weather and wind suited. Their aerial evolutions before they alight are truly beautiful. They appear at first as if reconnoitring the place, when suddenly throwing themselves into a vortex of apparent confusion, they descend spirally with astonishing quickness, and resemble very much a *trombe* or water-spout. When within a few feet of the ground, they disperse in all directions, and settle in a few moments. Their twittering, and the motion of their wings, is, however, heard during the whole night. As soon as the day begins to dawn, they rise, flying low over the lakes, almost touching the water for some time, then rising, they gradually move off in search of food, separating in different directions. The hunters who resort to these places, destroy great numbers of them by knocking them down with light paddles used in propelling their canoes.

DESCRIPTION of some new Species of NORTH AMERICAN INSECTS. By Captain JOHN LE CONTE of the United States army. Read Nov. 8th.

OWING to the difficulty of determining, in this country, what insects are known to naturalists in Europe, the science of entomology has as yet made but small progress amongst us : even if all the books which have been published on this subject were commonly available, we still should not be in a much better situation.

The collections which have been brought together in Europe from every part of the world, contain many more species than have been published, but which there are probably as well known to the learned, as those contained in the books.

In offering these few American species to the Lyceum as new, I have not acted without due caution and hesitation, and a proper regard to the character of our society. Being diffident of considering any thing as new, because it was not found in authors who wrote many years ago ; I have taken the precaution to ask the opinion and advice of the Baron Dejean of Paris, too well known as the profoundest entomologist and the most accomplished soldier of the age, for my feeble testimony to add any thing to his reputation.

They are most of them small, some minute : indeed, among these we are to search for what is new with a more confident hope of success. The numerous naturalists who at different times have traversed our continent, have long left little to be discovered except what is not very apparent to the transient observer. The true student of nature, however, will not despise any of her works because they are small, but find as much to observe and to admire in them as in the most bulky. As few are acquainted with any others than the Linnean genera, it has been thought advisable to add to the descriptions

of the species a few remarks on some that have been established since his time.

Bruchus lividus, reddish brown, beneath cinereous: elytra and sides of the thorax varied with cinereous; elytra striate. Length two lines. Inhabits Georgia in the seeds of different species of Hibiscus, which it perforates and partly consumes, without destroying the vegetative principle, in the same manner as the *Br. Pisi* is nourished in its imperfect state, and arrives to maturity in the common garden pea. Plate XI. fig. 1.

Mycetophila rufipes. Dusky: antennæ and legs ferruginous: elytra punctato-striate. Length three lines. Plate XI. fig. 2.

This genus is the same as the *Cistela* of Fabricius; and the present species, along with all the others, which amount to seven or eight in number, is found in the latter end of summer on different kinds of fungi. It appears to be found in every part of the continent.

Anthicus murinipennis. Thorax porrected into a horn and projecting over the head: antennæ, head, thorax and legs ferruginous; eyes black; elytra dusky with a cinereous pubescence. Length two lines. Inhabits Georgia on flowers. Plate XI. fig. 3.

This genus is the same with the *Notoxus* of Fabricius; but those species with the cornuted and projecting thorax, which are as many as four, may hereafter constitute a separate genus from the remaining species, which they but little resemble in habit.

Anthrenus hæmorrhoidalis black, shining, polished; tips of the elytra red, with a darker or dusty spot on each; legs dark brown; length one line and a half. Inhabits Georgia on putrid fungi. Plate XI. fig. 4.

Hister dimidiatipennis. Black; beneath shining: elytra much shorter than the abdomen, red at the tip, striate, the striæ curved. Length three lines and a half. Inhabits

Georgia in the same situations with other species. Plate XI. fig. 5.

Attelabus nigripes. Red ; head except at the base, antennæ, eyes, legs and breast, black ; elytra punctato-striate ; thighs toothed. Length three lines. Inhabits Georgia. Plate XI. fig. 6.

This species very much resembles the *Attelabus analis*, but this last has the snout, eyes, antennæ, legs and tail black, not the breast ; the elytra, moreover, are but faintly punctato striate. They both inhabit on the rose.

Cryptorhynchus moestus. Punctate ; above dusky, beneath and legs cinereous brown, the latter barred with darker ; elytra punctato-striate, with three raised and polished lines on each, sometimes varied with cinereous near the tip ; antennæ brown ; snout longer than the thorax. Length three lines and a half. Inhabits Georgia. Plate XI. fig. 7.

The Linnean genus *Curculio*, was found to contain so many species, that it became perfectly unmanageable ; it therefore has been separated into many, which perhaps may not be essentially distinct, but which the convenience of reference rendered necessary. This and the three next are all of this character.

Eccoptus minutus. Punctate : head and thorax black, the last varied with white : snout, antennæ, legs and elytra reddish brown : the last punctato-striate, and varied with whitish : body beneath hoary : snout shorter than the thorax. Length little more than one line. Inhabits Georgia. Plate XI. fig. 8.

Arthonomus suturalis. Dusky, shining : upper half of the elytra red : thorax punctate : elytra striate : snout as long as the thorax. Length about one line and a half. Inhabits Georgia. Plate XI. fig. 9.

Pissodes squamosus. Black, punctate : sides of the thorax and of the elytra irregularly marked, and varied with white : fore and hind thighs toothed : snout as long as the

thorax. Length one inch. Inhabits Georgia—rare. Plate XI. fig. 10.

The white marks on this appear to be minute scales, which may be rubbed off, and hence their irregularity.

Obrium dentatum. Punctate, pale brown: thorax with short streaks of darker: elytra entire, with four or five dentate waving bars of darker: two pair of hinder thighs thickened spinous. Length three lines. Inhabits Georgia. Plate XI. fig. 11.

This genus has been formed from some of the species of *Saperda* and *Callidium* of Fabricius.

Molorchus affinis. Black: elytra pale brown, with the tips and a spot at the base of each, black: legs dark brown. Length three lines and a half. Inhabits Georgia. Plate XI. fig. 12.

The *Molorchus* has been separated from the Linnean genus *Necydalis* from which it appears to differ chiefly in habit; it has the elytra shorter than the abdomen, and cut off square, whereas the *Necydalis* has them subulate at the tip.

Anthribus moestus. Dusky: elytra spotted in lines with black: forepart of the thorax with a small white spot: scutellum with another of the same colour: legs dusky, barred with gray: antennæ long. Length three lines and a half. Inhabits Georgia. Plate XI. fig. 13.

Lycoperdina ferruginea. Smooth, polished, reddish brown: eyes and tips of the antennæ dusky. Length two lines. Inhabits Georgia in fungi. Plate XI. fig. 14.

The *Lycoperdina* has been separated from the genus *Silpha* of Linné; it has the antennæ moniliform, increasing gradually in thickness towards the tip: mandible with a very acute undivided tip: maxillary palpi filiform, labial subclavate; thorax a little dilated on the forepart, and a little narrowed behind: thighs abruptly pedunculato-clavate.

Coccinella marginipennis. Black: spot on the fore part of the thorax, and margin of the elytra red: elytra with three red spots; the hinder one common: legs red. Little more than one line in length. Inhabits Georgia. Plate XI. fig. 15.

Galleruca janthina. Smooth, polished, shining blue: eyes black; thorax with an impressed transverse line: sometimes found inclining to greenish. About two lines in length. Inhabits from New-York to Georgia. Plate XI. fig. 16.

Colaspis infuscata. Pale brown: body beneath dusky: head antennæ, thorax, and three spots on the elytra, brownish dusky; the fore one lunate on the hinder side; the hinder one curved on each side in a contrary manner: the middle one rounded. Length two lines. Inhabits Georgia. Plate XI. fig. 17.

Chrysomela scalaris. Greenish blue: antennæ and legs brown: elytra punctate, yellow, spotted with greenish blue: the exterior spot at the base, lunate; suture with a broad greenish blue denticulate line. Length half an inch. Inhabits from New-York to Florida. Plate XI. fig. 18.

Altica oblonga. Above pale brown, beneath darker: eyes black: lateral margin of the thorax dark brown: thorax and elytra punctate. Length two lines. Inhabits Georgia. Plate XI. fig. 19.

Cryptocephalus subfasciatus. Thorax punctate: elytra punctato-striate. Black: lateral margin of the thorax and two spots on each of the elytra red, the one nearest the tip lateral, the other nearly forming a band. Length two lines. Inhabits Georgia. Plate XI. fig. 20.

OBSERVATIONS on the structure of TRILOBITES, and description of an apparently new genus. By J. E. DEKAY. With NOTES on the Geology of Trenton Falls. By Professor JAMES RENWICK. Read Nov. 22nd.

ONE of our associates on his return from the celebrated Falls of Trenton, in this State, brought with him a Trilobite, whose peculiar form and great size excited much curiosity. By referring to the descriptions of authors, it was satisfactorily ascertained to be different from any thing in the books. As the specimen, was however, much weathered, imperfect in some important parts, and had been accidentally distorted, it was deemed advisable to suspend further investigation until more perfect specimens could be procured.

At this juncture, Mr. John Sherman of Olden Barnevelt arrived in this city, and exhibited to the Lyceum a collection of Trilobites and other organic remains from Trenton Falls, such as perhaps were seldom before assembled together. He very generously enriched the cabinet of the Lyceum with a beautiful series of these relics, and kindly permitted drawings and casts to be made of those that he could not conveniently spare.

From these specimens we have been enabled to draw up the following characters of a new genus of Trilobites, under the name of

ISOTELUS.*

BODY, oval-oblong; often contracted, not unfrequently extended.

HEAD or buckler, large and rounded, equalling the tail in size, with but two oculiform tubercles.

ABDOMEN, with eight articulations.

Frontal process beneath with two semi-lunar terminations.

* From ἴσος equal and τέλος end, extremity.

ST-ABDOMEN or tail, broad, expanded with indistinct divisions, as large as the buckler.

Longitudinal lobes very distinct.

This genus will be sufficiently distinguished from the five genera, proposed by *M. Alexandre Brongniart*, in his valuable and truly philosophical work on the Trilobites, by the following particulars.

From *Calymene*. By the presence of but two tubercles on the buckler, not reticulated; by the abdomen with but eight articulations.

From *Asaphus*. By the middle lobe which is double the size of the lateral ones; by the absence of a membranous expansion on the sides; by the non-reticulation of the eyes, &c.

From *Ogygia*. By the rolled form; the rounded posterior angles of the buckler, and the distinct articulation of the longitudinal lobes.

From *Paradoxide* and *Agnoste*, by characters too obvious to be enumerated.*

* NOTE. As the work of *M. Brongniart* is expensive and rare, and has never been translated, we have annexed an abstract of his genera of Trilobites.

GENUS CALYMENE.

Body contracted into nearly a semi-cylindrical sphere.

Buckler with many tubercles or folds. Two reticulated eye-shaped tubercles.

Abdomen and post abdomen with entire edges; abdomen divided into twelve or fourteen articulations.

No elongated tail.

4 species.

GENUS ASAPHUS.

Body broad and rather flat; middle lobe prominent and very distinct.

Flanks or lateral lobes, each double the size of the middle lobe.

Submembranous expansions extending beyond the lateral lobes.

Buckler semicircular, furnished with two reticulated eye-shaped tubercles.

Abdomen divided into 3 or 12 articulations.

5 species.

ISOTELUS gigas.* Plate XII. fig 1. Pl. XIII. fig. 1.

Head representing a spherical triangle, surface punctate, convex descending from between the eyes to the anterior border, which has a narrow raised rim: posterior extremity concave and corresponding to the articulation of the abdomen. *Eyes* elevated, prominent, sub-pedunculated; cornea oblong, lunated, highly polished. *Abdomen* with eight distinct articulations, the middle lobe double the size of the lateral one; these latter are continuous with the middle lobe, have a deep furrow impressed on their upper surfaces, which becomes gradually effaced towards their narrow free extremities. These

GENUS OGYGIA.

Body much depressed into an oblong ellipsis, not contractile into a sphere.

Buckler bordered, a slight longitudinal furrow arising from its anterior extremity. Posterior angles elongated into points.

Longitudinal lobes not very prominent.

Abdomen with 8 articulations.

Eyes not prominent nor reticulated; no other protuberances on the buckler.

2 species.

GENUS PARADOXIDES.

Body depressed, not contractile.

Flanks larger than the middle lobe.

Buckler nearly semi-circular; three transverse furrows on the middle lobe; no eye-shaped tubercles.

Abdomen with 12 articulations.

Articulations of the lateral lobes extended more or less beyond the membrane which sustains them.

5 species.

GENUS AGNOSTUS.

Body ovoid, semi-cylindrical.

Buckler and flaps bordered, with the edges raised.

Middle lobe with two transverse divisions each composed of a single piece.

Two glandular tubercles on the anterior part of the body.

1 species.

lateral lobes are rounded at their extremities, and flattened in such a manner as to allow each lobe to slide easily under the lobe immediately preceding. *Tail** subtriangular, convex, equalling the head in size, with the posterior termination rounded. On the centre of its surface, when accidentally decorticated, a slight elevation may be traced, if the specimen be held in a certain light, which appears to be a continuation of the middle lobe; this extends to within a short distance of the posterior angle of the tail, when it is either entirely effaced, or terminates in an abrupt truncation. Another elevation runs parallel to, and at a short distance from the edge of the tail. These elevations are connected by obscure parallel lines, imitating the spaces between the lateral lobes. When the tail is fractured on the borders, a semi-lunar depression is visible, exhibiting concentric striæ. The whole surface of the animal has a jet black polish.

Total length, 6—12 English inches.

Cabinet of the Lyceum.

This animal, it will be seen, varies much in size; but the following dimensions are taken from the individual represented in the plate, where it is of course much diminished.

Total length	7·1
of the head	2·2
of the abdomen	2·2
of the tail	2·7
Breadth of the head	3·5
of the abdomen	3·7
of the tail	3·5

* The word *tail*, is used in the common acceptation of the term, although as it often contains a portion of the alimentary canal, or the branchia, or both, it might be termed the post-abdomen. The analogy between the parts of crustacea and the vertebrated animals, is, however, very remote; still we should avoid coining a new word, unless it becomes necessary to express a new idea.

Breadth of the middle lobes	1·6
of the lateral lobes	·8
Depth of the buckler	·9
of the lateral lobes at their free extremities	·6

These dimensions exhibit an animal of large size, but the Cabinet of the Lyceum possesses a very considerable portion of an individual of this species, which, when extended, must have been at least seventeen inches long. M. Alexandre Brongniart, speaks of an *Ogygia* 39 centimetres, or about fifteen and a half English inches in length. The thickness of the animal may be determined by those specimens, Pl. XII. fig. 1. in which the head and tail are closely applied to each other. The form and position of this latter organ, it may be cursorily remarked, bears a striking resemblance to that of the *Hippa emerita*.

ISOTELUS planus. * Plate XIII. fig. 2.

Head more rounded than the preceding, less elevated. Tail flat, rounded.

Total length	2·1
Breadth	1·1
Length of head	·6
of abdomen	·8
of tail	·7

Cabinet of the Lyceum.

This may possibly prove the young of the preceding species. The relative proportions of its buckler and tail vary considerably from those of the *I. gigas*, as may be seen by the dimensions given above. The depth of the lateral lobes, which exceeds three tenths of an inch, would almost of itself determine it to be a new species. Should it, however, be considered identical with *I. gigas*, it furnishes additional proof of the very rapid growth of these animals.

Hitherto these are the only species of the genus yet discovered. The *Asaphus cornigerus* (Schlottheim) may perhaps be

arranged with it, as some of its characters would seem to render it inadmissible into the genus *Asaphus*, unless its present characters should be modified or altered. It is impossible, however, to speak positively without an examination of the specimen itself.

Of the nature of Trilobites.

Various conjectures have been hazarded respecting the nature of these extinct animals, and its affinities with recent species. It has been described as a shell with three lobes; as the larva of an insect, as a perfect insect, as analogous to the genera *Chiton* and *Patella* of shells, and more recently to the class of crustaceous animals.

M. Latreille, in a paper entitled, "*Affinites des Trilobites*," published 1821, maintains that they bear the nearest affinity to the genus *Chiton*. He supposes their articulated bodies, the membranous border evident in some of them, and their supposed habitations, to corroborate this opinion. On the other hand, he asserts that the absence of antennæ and of feet, are fatal objections to their being classed with crustaceous animals. He also alludes to the fact of *Trilobites* having prominent eyes; and according to him, those crustacea which have been considered most analogous to *Trilobites*, are not furnished with equally prominent organs of vision.

M. Alexandre Brongniart, on the other hand, argues that *Trilobites* are crustaceous animals, from the following considerations. The general form of *Trilobites*; their constant division into a head which is confounded with the buckler, an abdomen, and a post-abdomen or tail; the sessile position of the eyes; the rough and tubercular teguments; the great number of transversal articulations, and finally, even the manner of contracting itself into a ball, present an assemblage of characters which belong only to the crustacea of the order *Gymnobranchia*. The trilobate division of these animals, led

him to endeavour to find something parallel among the crustacea. He has traced the rudiments of this division in the *Palinurus*, *Gammarus*, *Talitrus*, *Cymothoa*, *Ligia*, and it might doubtless be traced in many others.

The objection to their being crustacea, derived from the fact that they have neither antennæ nor locomotive organs, is more serious. If they had ever been provided with these parts they would surely have been discovered ere this : but neither the researches of naturalists in Europe, nor our own observations, have exhibited the slightest indication of their presence ; but in the order *Gymnobranchia*, the antennæ are either very small or disappear ; and the feet changed into natatory organs or gills, lose their solidity. If the *Trilobites* then are supposed to have belonged to this order, we may look in vain for feet or true antennæ.

It is probable that the lateral lobes are the true organs of locomotion ; and this opinion receives considerable support from the following considerations. We shall afterwards endeavour to show that they also may hold the branchial apparatus.

In those specimens of the *Isotelus* in the Cabinet, which are contorted or doubled up upon themselves, the extremities of the lateral lobes are found to be diminished in size, as if they were folded under each other, while the parts near the middle lobe retain more or less their natural position. This would seem to indicate that the extremities were free, and of course served as organs of locomotion. They may also have served to seized their prey ; in this they were possibly assisted by the tail. In other specimens, however, we have undoubted evidence of this structure. In these, which appear as if a strong power had been impinged upon the middle lobe, the lateral ones are forced so widely apart that they can be examined and even measured. A reference to the figure of the *Alpheus aculeatus* and others, as given in the appendix to Parry's

voyage, will show the structure and mechanism of these lateral lobes, better than the most detailed description.

Admitting then this opinion, there would be little occasion for feet, or they might be merely rudimentary. This is in conformity to the law of organization, by which the loss of certain parts is supplied by an extra development of others to perform the same functions. Thus, not to go out of the class of the crustacea, *Hippa* and its allied genera have minute and almost abortive claws, and no pincers at their extremities. To compensate for this, the mouth with its large horny jaws, is so much enlarged, as to serve as an organ of prehension.

The question, however, still recurs, to what genus of the crustaceous animals, are the Trilobites nearest allied? In other words, what living animal most resembles this extinct being? Our observations have led us to adopt the opinion, that the *Isotelus*, and by analogy other trilobites, bear a striking affinity to the *Limulus polyphemus*, or common "*Horse-foot*" of our shores.*

1. The *Limulus* itself has been found, though rarely, in a fossil state. By comparing these with the living *Limulus*, M. Desmarest, remarked that the inferior (posterior?) angle of the buckler was more obtuse in the fossil. The *Isotelus* also has these angles more obtuse. The same distinguished observer states, that the tail of the fossil species, is divided by longitudi-

* This large and common species has been much neglected by our anatomists.

The following are the species as near as they can be determined from the confused accounts in the different systems.

1 { *Limulus polyphemus*. Latreille, Bosc. } United States.
 { *Polyphemus occidentalis*. Lamarck. }

2. *L. mollucanus*. Latr. *P. gigas* Lam. Molluca Islands.

3. *L. heteroductylus*. Lat. China.

L. cyclops. Bosc. doubtful. *L. albus*. Bosc. The cast-off shell of a young *Limulus*?

L. Smeebii. Leach. probably the *polyphemus* not fully grown.

nal furrows into three parts; we have indicated rudiments of a similar division in the specific description of the *I. gigas*.

2. The description and figure of a fossil Trilobite, as given by Parkinson in the third volume of his Organic Remains, represents an animal intermediate between the recent *Limulus* and our Trilobite. The head is imperfect. "The body (abdomen) has five transversal plates; its sides go off directly from the head, and meet speedily at an obtuse angle, &c."

A direct comparison of the recent *Limulus* with the *Isotelus*, will furnish us with additional arguments in favour of their near resemblance. The former animal is often taken in great abundance along our shores, and when thus taken, is immediately turned over on its back to prevent its escape; in this position they are well-known to inflect their abdomen upon the buckler. And this seems to be an approximation towards similar habits of the Trilobite.

4. The lunated transparent cornea, which may be seen in many of the Trilobites in the Cabinet, bears a very strong resemblance to that of the *Limulus*. In young individuals of the *L. polyphemus*, the eyes are partly raised on the exterior spines of the first row, these, together with the other spines, are effaced by age, and the eyes then become nearly continuous with the surface of the buckler. This fact may stand as an answer to one of M. Latreille's objections.

On the anterior edge of the buckler, a raised rim or border is equally observed in the *Isotelus* and *Limulus*, and the rudiments of two longitudinal depressions on the buckler of the *Limulus*, are very apparent.

6. The upper surface of the abdomen of this latter animal, exhibits seven foramina, connected beneath with as many thin membranous gills. We have only to suppose these foramina extended transversely across the abdomen, and we have at once the lateral lobes of the Trilobite.

Finally, the analogy between the Trilobite and *Limulus*, derives additional support from the following circumstances,

One of the specimens of *I. gigas* was accidentally fractured in such a manner, as to exhibit *the under side of the animal*. Pl. XII. fig. 2. The appearances presented by this fortunate fracture, induced many to believe that they were true teeth : upon the supposition that these Trilobites resemble most the *Limulus*, we endeavoured to discover something analogous to them in the latter animal. Our inquiries were crowned with success. It may be necessary to premise, that in the *Limulus* the anterior part of the buckler is reflected beneath the animal, and forms a flat horizontal surface. This surface is bounded by two lines, which are the terminations of curved planes arising from the superior internal part of the buckler. These three planes meet and form at their point of junction, an acute hollow spine nearly over the mouth, and directed backwards. This spine is more evident in young than in old individuals, and its posterior angle, as we look towards the inferior side of the animal, is beset with bristles, resembling in arrangement and direction those on the first articulations of the feet. In the *Isotelus*, this spine becomes double ; they are broader and curved towards each other. They are six lines in length, the terminations sharp and translucent. The angles in front of the observer, will of course be recognised as the junction of the descending planes of the internal crust of the buckler. Pl. XII. Fig. 2 represents these processes, and fig. 3. analogous parts of the *Limulus*. It will be understood, that in the latter figure we look at the under surface of the buckler, while fig. 2. exhibits the upper side of this surface, the buckler being removed. This last was selected in order to show their triangular structure, and it would seem that the specimen from which it was taken, was probably the cast-off shell of a Trilobite ; at least the *Limulus* creeps out of its shell through a similar separation of the whole anterior part of the buckler. It is not to be considered at all, as the mouth of the animal, which is probably placed between these lunated processes.

So little is known respecting the habits of the *Limulus*, that the use of its spine is undetermined. In this state of absolute ignorance, it may be permitted to conjecture that it is in some measure an arm by which they seize or secure their prey. In the *Isotelus* this part is double. Hence we might infer that it had greater facilities for furnishing itself with food, and this would in a degree render unnecessary, feet armed with pincers, and partaking of the calcareous nature of the body; or, from the existence of setæ on corresponding parts of the *Limulus*, they may possibly have been accessory organs of locomotion themselves, analogous to the setiferous prominences in the class Annelides, which are described as feet by the acute Savigny: or, possibly these frontal processes are organs of defence. When attacked, this animal may roll itself up into a ball, as indeed it is often found, (see Pl. XII. fig. 1.) and by some mechanism these processes may be inserted into corresponding cavities in the tail, and thus retain permanently a rolled position, presenting nothing but its calcareous covering to the enemy: or, lastly, they may supply the place of antennæ, for which their form and contiguity to the mouth and brain, would seem to render them peculiarly applicable.

Whatever may have been their uses, there is no doubt that we have at length discovered a large and not unimportant part of the under side of the Trilobite. A more extended and minute investigation of the anatomy and habits of the *Limulus*, will hardly fail to throw much light on the present obscure history of Trilobites, and we hope will confirm the positions we have endeavoured to establish.

Since the preceding was in type, we have had an opportunity of examining in the "Nova Acta Regiæ Societatis Upsaliensis" for 1821, a paper by Professor Wahlenberg, entitled, "Petrificata telluris Suecane examinata." In this memoir, the author has arrived at the same conclusion with ourselves, as regards the analogy between the Trilobite and *Limulus*, although from different considerations.

Professor Wahlenberg supposes that the branchial apparatus was most probably placed under the middle lobes of the abdomen, and the feet to have been situated beneath the head or buckler.

Trilobites, according to Professor Wahlenberg, were furnished with short feet, which served at the same time; as accessory organs of mastication. He assigns as a reason why they have never yet been discovered, that most of the remains now found, are the exuvia of Trilobites, in which these parts of course, would not easily be discovered. Those only he considers as perfect animals, which are found rolled up on themselves; and in these alone can we expect to find the feet of Trilobites.

In a supplement to this paper, he has described and figured two species, *Entomostracites crassicauda*, and *E. extenuatus*, which appear to belong to the Genus *Isotelus*.

Geology of Trenton Falls.

Situation. Upon West Canada Creek, near the village of Olden Barneveld, and about 13 miles north of Utica. West Canada Creek is one of the principal branches of the Mohawk river, it rises on the confines of Hamilton and Herkimer Counties, and falls into that river near the village of Herkimer.

Depth and extent of formation. The river has worn itself a passage through the rock for the distance of nearly two miles, forming a series of water-falls, and has thus laid open to view the strata to a depth of probably 300 feet. The layers thus disclosed, are nearly horizontal, and of various thicknesses; they are composed of limestone, with the exception of numerous thin veins of argillaceous matter. The scenery in the glen, worn by the stream, is of the most picturesque and romantic character. From the high land, seven miles north of Utica, this rock appears to form an unbroken ridge of nearly equal height for many miles, extending from the valley

of the Mohawk in a north-western direction, as far as the eye can reach. At the Little Falls, the same formation was found constituting the western side of the Falls Mountain, but whether superincumbent or subjacent, was not determined. Eaton inclines to the former opinion, and states that this formation extends to Lake Ontario.

Chemical and external character. The higher strata are composed of carbonate of lime nearly pure, of a light gray colour, and crystalline structure, easily separable into rhombic crystals; they may be readily burned into lime, and are much used for that purpose. At greater depths the substance becomes more compact, of a darker gray colour, and finally quite black. It is then highly fetid, and unfit for the purpose of burning into lime in the usual manner; it still, however, effervesces violently with acids. No nodules of horn-stone were perceived in any part of the rock. The lower strata are susceptible of a high polish, and might probably be advantageously worked as quarries of black marble, being fully equal in beauty to the *Lucullite* of Derbyshire.

Mineral contents. No mineral contents of any value were observed; in some few cases, the contained petrifications were found to consist of sulphuret of iron.

Organic remains. The animal remains contained in every part of the rock, are extremely abundant, in some cases making up nearly the whole mass. No remains of vertebral animals have been observed in any of the specimens brought from this locality, or in the rock itself.

Encrinites and *Fungites* (of Knorr) are found in great quantities, some of the strata contain no other petrification than the former, and they are copiously disseminated through them all.

Trilobites frequently occur; the Dudley fossil (*Calymene Blumenbachii* of Brongniart) was at once readily distinguished; another unknown to the observer was found, which it appears has not hitherto been described; this, after attentive examination, was determined to belong to a new genus, and

is described as such in the former part of this paper ; a single individual differing sufficiently from this to entitle it to be considered as a separate species, was afterwards brought to New-York by Mr. Sherman, by whom this interesting locality was first explored. Of Chambered Univalves, one species of *Nautilus* occurs, and three of *Orthocera*. One of the latter is peculiar in its figure, and will probably, on examination, prove a species that has not been fully described ; this peculiarity consists in its being composed of two conical frustums of very unequal dimensions, contracting suddenly at the place of junction. A specimen of this kind in the collection of Mr. Sherman of Trenton, is nearly 3 feet in length ; by the continual action of the water it has been worn down to the axis, and exhibits, in a striking manner, the position and formation of the Septæ and Siphunculus ; from its shape it is vulgarly supposed to be the petrification of a large animal of the Lizard species ; a similar mistake is said to have been made by Whitehurst, in relation to an *Orthocera* from Derbyshire, probably an analogous specimen.

No univalves without chambers have hitherto been found.

Of bivalves, the specimens exhibit several species of *Terebratulæ* and *Producti*.

Nature of the formation. Organic remains furnish the most decisive evidence of the identity or difference of formations. Judging from those which occur at Trenton, we should consider the rock to belong to the transition class, the submedial of Coneybeare and Philips. This deduction is founded on the presence of the *Calymene Blumenbachii*, which the united testimony of Buckland, Coneybeare and Philips, and Brongniart ascribe to that order of rock. Were it not for this, the small inclination of the strata might have been considered as entitling it to be arranged as a part of the first floetz formation of Werner, or it might have appeared from the number of *Entrochi* or Encrinitic vertebræ, to belong to the mountain limestone of English authors. Eaton is there-

fore, probably correct in classing this formation as transition, although he enumerates fossils that never occur in rocks of that class, and among others, the *Belemnite* and *Gryphite*. In all our specimens we do not find any of these species; we must therefore conceive that he has been under some error in this statement, having probably mistaken a small kind of *Orthocera* for the former, and the *Nautilus* for the latter of these petrifications.

American Localities of Trilobites.

It is an interesting subject of inquiry, how far the fossil species of our continent agree with, or differ from those of Europe. It is a fact well known, that the living animals which inhabited America at the time of its discovery, were entirely different from those of the old world. Analogy would lead us to infer, that a similar law might hold good in relation to extinct species and genera. This, however, does not appear to be the case, for, in comparing the American rocks that have hitherto been examined, and their fossil contents, with those of Europe, it would seem to be probable, that the remains they contain are identical, there being no variation of any great importance in the contents of similar rocks. A few instances do indeed occur of extinct animals found in one continent, and not in the other, but they are not sufficiently numerous to constitute more than an exception to this general rule, and they are always accompanied by species that are common in both hemispheres.

Trilobites have been found in many different localities of North America, and the industry of several indefatigable collectors is hourly adding to the number.

The *Calymene* of Blumenbach occurs at Trenton Falls, at Black Rock on the Niagara, and on the Miami river; the *Calymene macrophthalma*, on the Helderberg Mountain near Albany, and at Coshung Creek near the Seneca Lake, in the

State of New-York. In the cabinet of Major Delafield, is a *Calymene*, from Paterson, N. J. of a species that has not hitherto been described; and in the collection of the Lyceum is another, probably also new, and brought by Mr. Cooper from Leroy, in our State.

Species of the *Asaphus* are to be met with at Glens Falls on the Hudson River, at Kingston on the Wallkill, on the Banks of Lake Cayuga, and of the Seneca Lake, on the south shore of Lake Erie near Sandusky, on the Kaatskill Mountains, and at Greenville Falls on the Ottawa river in Upper Canada. The five last localities are furnished us by Major Delafield, who has good specimens from the several places.

Specimens of the genus *Ogygia*, are said by Brongniart to have been brought from the Genesee river, and from the Banks of the Mohawk river near Schenectady.

Besides the Trenton locality of the *Isotelus*, we have seen in the cabinet of Major Delafield, a portion of limestone nearly similar in appearance, and containing numerous impressions of the tails of animals of the first species of that genus; at was found at Canajoharie.

In the British Geological Transactions for the year 1823, a new Trilobite is described by Dr. Bigsby, to whom the geology of our country is under so many obligations. Not having that work before us, we are unable to say to which of the genera of Brongniart it belongs, or whether like the *Isotelus*, it may not be considered as the type of a new genus.

It thus appears that the genera and species of this interesting family are numerous in our country. Opportunities will therefore not be wanting to future inquiries to examine more particularly its relations with the organized beings at present existing. Could any positive light be thrown upon their habits and mode of life, it would probably add much to our knowledge of the previous state of the earth, and thus extend the boundaries of geological science.

OBSERVATIONS on the manners of the *HYSTRIX DORSATA*, or
Porcupine of North America. By FREDERICK S. COZZENS.
Read Nov. 22d. 1824.

THIS animal, which was first made known to naturalists by Edwards as a distinct species, has been but imperfectly described, and its singular manners and history but slightly noticed. Having obtained one in my excursion last summer, I have conceived I might possibly add some few facts to natural history by publishing the observations I have made on it.

On the first view of this animal, the analogy between it and the sloths of South America is clearly and satisfactorily exhibited; and I am somewhat surprised that this fact has not before been noticed by authors. The slowness of its motions, and its remarkably long claws, are not the only peculiarities which prove its affinity to those animals. Even in its spiny covering, some likeness may be traced to the thick bushy hair of the *Ai*, and it seems to hold a place between the genera *Erinaceus* and *Bradypus*.

The porcupine, when full grown, weighs between twenty and thirty pounds, and is about two feet in length including the tail, which is nearly one-third the length of the body. The general outline somewhat resembles that of the beaver, with the exception of the snout, which is abruptly truncated, broad, and with the upper lip divided. The back part of the head and neck are thickly beset with a cluster of small spines. The legs are uncommonly short, the joints not more than one inch and a half in length, bending inwards, and covered down to the claws with long bushy hair. On the fore feet he has four, and on the hind feet five, toes; which are furnished with remarkable long and curved claws, well adapted for climbing the highest trees. In walking, the tibia, as well as the tarsus, rest upon the ground, after the manner of the tortoise, which gives him an uncouth gait, or awkward hobble. His cover-

ing consists of long coarse hair, and a coat of shorter fur, intermixed with scattered spines. But the great cluster of spines, (or *quills*, as they have been termed,) and which he uses as a means of defence, are attached to a loose skin on the extreme part of the back near the tail, and when at rest can barely be seen projecting through the hair around that part. But on the animal's being irritated, he has the power (by means of strong muscles attached to the neck) of spreading them over the back with their points in every direction. Nor is this the only means of defence he makes use of. The tail, which is also armed with smaller spines, is held close to the body, or elevated in such a manner, that on the approach of an enemy he can strike suddenly, leaving his barbed spines, which adhere very loosely, to find their way to the very heart of those who molest him; for it is a fact, that they have the extraordinary and peculiar property of penetrating further into the flesh after being once lodged: and it often happens that dogs have been penetrated by them in every direction, so as frequently to cause their death. This arises from the structure of the points, which are very sharp, and covered with a great number of small barbs, scarcely perceptible to the naked eye, lying imbricated over each other, and pointing backwards, so that on the least motion they are propelled forwards, in the same manner that an ear of rye will move up the arm when placed on the wrist. The tail which is large, and of a fleshy substance, is linguiform, depressed and about the thickness of a man's hand. Above, it is studded over with numbers of smaller spines; beneath it is thickly matted with a sort of bristles. On the upper surface there exudes a strong and fetid oil from a number of small pustules, which gives the quills a greasy appearance, and probably may be another means of keeping his enemies at bay. In walking this member is dragged along the ground.

The quills are white, tipped with black, and are from half an inch to three in length. They are loosely attached to the

skin, and come off very easily. The ears are entirely hid under the spines and hair. The eyes are small, shining, and black, and the expression of the countenance gentle and innocent.

They vary very much in colour; the most common is a dark brown intermixed with white, giving them a gray appearance. The white is generally a kind of coarse hair, considerably longer than the other. Their voice is feeble and whining, from an octave descending to a sixth. Their food is the bark and leaves of the hemlock (*pinus canadensis*) and basswood (*tilia glabra*;) and they have been known to strip trees of their foilage in the same manner as the sloths of South America. They are, however, fond of sweet apples, corn, &c. which they eat holding in their fore claws in a sitting posture. The Indians say they are most excellent food, and esteem them highly. When they are discovered on the ground, which seldom happens, they do not strive to get out of the way, but on being approached, immediately spread the spines situated near the tail over the whole of the back.

Of late years they have multiplied greatly, and are become numerous near the Oneida Lake, and in the north-western part of the State of New-York. Their quills are dyed of different colours by the Indians, and used as ornaments in giving a border to moccasins, wampum, leggins, and other parts of the Indian costume.

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and to JAMES E. DEKAY, for Plates V. VII. XII. and XIII.*

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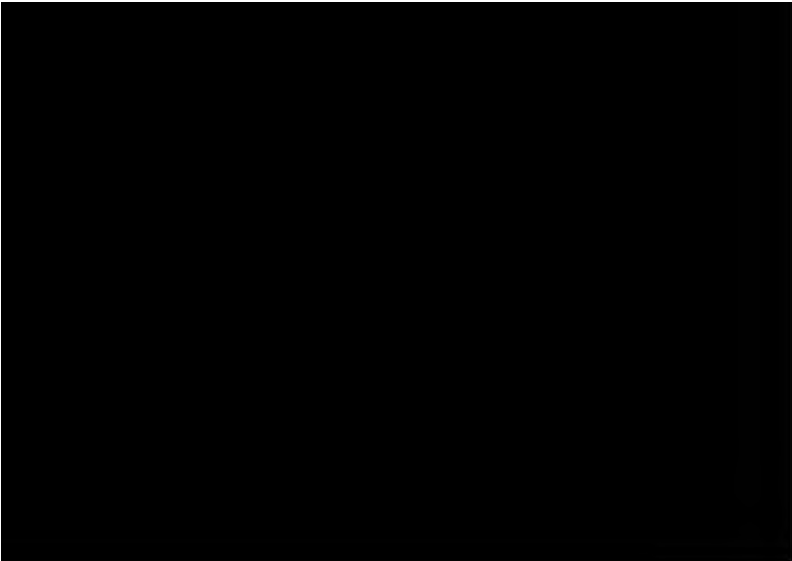
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NOTICE of FOSSIL CRUSTACEA, from *New-Jersey*. By JER.
VAN RENSSELAER, M. D. Read Nov. 15, 1824.

NEW-JERSEY presents to us the richest localities of fossils with which we are acquainted in this hemisphere. Situated between the two great schools of natural history, it is surprising that it has never been made the scene of more extensive research. The cursory examinations it has received from both cities have proved so gratifying, that we may hope some enquiring brother will be induced to investigate more minutely the depository of these medals of nature, so abundant in our fertile region,* and more particularly in the triangular peninsula comprised between the ocean and the Delaware and Raritan rivers.

During an excursion made to this interesting region, some months ago, in company with Messrs. Dekay and Cooper, we had the satisfaction of increasing the cabinet of the Lyceum by the addition of the fossil remains of the *Mastodon*.† I have now the pleasure of noticing some specimens of fossil crustacea found during that excursion, and which are the first of the kind found in this country, so far as my knowledge extends: certainly the first that have been described. There are portions of a crab in the cabinet of the Academy of Natural Sciences at Philadelphia, said to have been found on the surface of the soil on the banks of the Potomac: I am informed they bear no other evidence of being fossil.‡

Which I have partially described in a paper read before the New-York Lyceum and Philosophical Society in March last, and which has been or will appear in the next volume of their Transactions.
On page 143 of this volume.

Immediately after this paper was read, Major DeLafield informed me that he had part of a fossil crab from York river; but he has never been able to describe it since.

It is much to be regretted that no scientific work has pointed out the distinguishing characters of fossil and merely preserved shells.

The remains in our cabinet consist of fragments only : that is to say, we have parts of eight hands, more or less perfect, (four of the right side, three of the left, and one doubtful,) and the third joint of one of the legs. The great dissimilarity of these several parts evinces to me four very distinct varieties, which I shall endeavour to describe, in reference to Plate XIV.

Fig. 1. The right hand of a crab viewed internally, where it is flat and smooth ; externally, protuberant. The finger moveable. Thumb and finger of equal length, smooth, slightly compressed internally, and rounded externally. We have the corresponding left hand in a more perfect state as to outline, but with small parts of the finger wanting.

Fig. 2. This specimen is unfortunately much fractured. I have presented an external view of the left hand, which has suffered great violence, and has the finger and thumb broken and out of place, but still slightly adhering. The lower margin of the hand is smooth, as is the outer margin of the finger ; the thumb, on the contrary, has a double row of small spines accompanying its lower margin.

Fig. 3. Represents the interior of another left hand, on which only small parts of the thumb and finger are visible. The exterior is beautifully circular, the interior ovate and emarginate. In the central line are several small spines or tubercles, which are again observed more thickly surrounding the root of the thumb, and extending along its upper margin. Part of this thumb has been accidentally broken off since we found it. We possess also a right hand, about as perfect as this, which, from its position when found, and the strong resemblance, I take to be its fellow ; it certainly belonged to an animal of the same species.

Fig. 4. Part of a claw, with the greater part of the thumb and finger. The claw is compressed and emarginate. The smaller finger is an irregular triangle, bearing spines

on the angles. The thumb or longer finger has five rows of spines extending its whole length, and approximating towards the smaller extremity.

It is exceedingly difficult to trace analogies between fossil and recent species, especially where only parts of the animals are offered for observation. Moreover, the old Linnean genus *Cancer* has undergone so many alterations and modifications by the labours and observations of Fabricius, Bosc, Latreille, and Leach, that it is not easy to arrange recent, much less fossil specimens. I must be allowed to remark, however, that fig. 4. presents many points of resemblance with the *Pagurus Faujasii* of Desmarest, as exhibited in Pl. XI. fig. 2. of his work on Crustacea, in conjunction with M. Brongniart on Trilobites. It strongly resembles the smaller claw on that plate, the original of which was from Maestricht, and described by Faujas St. Fond as the *Pagure l'hermite*: and which Latreille notices as approximating very nearly to the *Pagurus Bernhardus*. The analogy between the recent and fossil is so great, that they might easily be mistaken: the only difference, perhaps, being the length of the claw. A circumstance tending to confirm the supposition of M. Latreille, that it was the hermit crab, is the fact that only claws are found at Maestricht, and never the body, which he accounts for naturally from the durability of the claw, and the liability of the body to decomposition. Although at Tinton Falls we saw many claws, neither of us could discover any other part of the animal.

Messrs. Cuvier and Latreille place all the fossil crustacea hitherto found (with the exception of two specimens) in the first order, viz. decapode: so that we are probably correct in the place assigned to our new varieties of fossil.

The crabs of Maestricht are found in a formation analogous to, perhaps equivalent with, the chalk of England, in which Mantell first noticed them. They are found in the plastic

clay of the isle of Sheppey—in the calcaire grossier of Paris—in the limestone of Pappenheim—and in the tertiary of New-Jersey; the precise spot seems to be a conglomerate sand strongly tinged with iron.

It has been remarked by Desmarest, that in geological position the trilobite is older than the crustacea—but with no great difference of age; and that the trilobites end, where the crustacea begin: a remark that will probably be confirmed by the relative position of our own trilobites and crustacea, if indeed they are to be considered separately.

A SKETCH of the GEOLOGY of the ISLAND OF MONTREAL.
By J. J. BIGSBY, M. D. Read Dec. 13, 1824.

THE picturesque and fertile island of Montreal, having close on its north the smaller "Isle Jesus," is situated seventy-six miles above tide-water, in the St. Lawrence, at the confluence of that river with the Ottawa. It is chiefly embraced by the waters of the latter stream; on the north by its small fork, called the "Rivière des Prairies," flowing through low grounds, and occasionally checked by ledges of limestone; on the west, by its large and irregular expansion, the Lake of the Two Mountains; on the south by Lake St. Louis,* (in which the two rivers join without mingling) and the rapids forming its outlet, which turn round the great south angle of the island, and pass, with intervals of tranquillity, for eleven miles over reefs and stony shallows; finally, it is contained

* Its length passes nearly east and west, and is eighteen miles, by eight miles in greatest breadth. The purplish brown water of the Ottawa occupies the half nearest Montreal Island, the line of separation being abrupt and pretty straight.

on the east by the St. Lawrence under its own proper name, moving with a steady current between regular banks, two and three miles apart, and sprinkled here and there with grassy isles, of which the Boucherville group is the most numerous.

This island, in shape, resembles an isosceles triangle. It is thirty-two miles long in a northeast direction, and ten miles in its greatest breadth, from the apex to the base. With the exception of Montreal Hill, its subordinate alluvial ridge, and one or two others of no great elevation, it exhibits a level surface, watered by several rivulets, but none of note. It possesses a plentiful and well-tempered soil, vegetable and loamy; but in the centre of the island there are occasional patches of ferruginous sand; and near Lachine, the ground is much incumbered with bowlders. At St. Anne's, in the west, and along the Rivière des Prairies, the rocks are sometimes thinly clad, and show themselves in small platforms. The island is traversed longitudinally by five roads, at regular distances from each other, and with cross-cuts: another skirts its circumference. The relative situation of its villages will be best learned by recourse to the accompanying map. Pl. XV.

Montreal Hill, overlooking on the southeast the rugged Isle of St. Helen and the town to which it gives name, is placed on the south side of the island, fourteen miles from its lower end, and about a mile from the St. Lawrence. It stands alone, in an extensive and highly cultivated plain, intersected by large bodies of water, and terminated on the north and south by mountains of fine features, but in other directions stretching unobstructed into Upper Canada, and into the eastern townships of Lower Canada. The aspect of this hill is rendered striking by its massiveness, as well as by its position. It dips on the east and southeast precipitously from a rounded summit of scantily wooded rock, and elsewhere presents rugged hummocks, or steep declivities, clothed with birch, poplar, and maple. Its base, and part of its sides, are occupied by orchards, farms, and gentlemen's seats: excepting

the level space immediately on the northeast, employed as a race-course. It is a long oval, extending from northeast to southwest for nearly three miles, and having a comparatively small breadth; now and then, however, increased by lateral projections on the north, enclosing little vallies. It is separated into two unequal portions by a broad fissure, now used as the west road to the interesting village of St. Catharine. The western of these divisions is frequently called Mount Trafalgar. I am not certain which is highest. The surveyor-general of Lower Canada states the greatest elevation of the hill to be five hundred and fifty feet above the contiguous river; * the measurement having been directed, I believe, to the flagstaff on the northeast end of the hill; on the southeast declivity, below which flagstaff, it may be mentioned for the sake of reference hereafter, there is an elegant monument in memory of Mr. McTavish, one of the founders of the Northwest Company or Fur Traders.

A ridge, or bank, of sand and other rolled materials, rests on the base of the hill on the south and east: somewhat closely near the village of St. Henry: but in general there intervenes a varying breadth of flat, marshy, or stony ground. Its height is greatest at the above-mentioned village, where it is ascended by the Lachine turnpike. It is scarped there, and may be one hundred and forty feet high. Near Montreal it is called "Coteau St. Pierre," and slopes to a lower level, about twelve feet above the St. Lawrence, from an elevation of less than one hundred feet. This bank is scarcely apparent on the north side of the hill, but extends from it, east and west, to the ends of the island, at a small interval from its shore. It is every where smooth and rounded, furrowed by streamlets, and somewhat lowered, except at Chateau Brillant, on the Lake of the Two Mountains. The vicinity of the

* New measurements will be taken this winter.

Rivière des Prairies is sandy in spots, and undulating ; but on the whole, low.

From the town of Montreal, eastward, the immediate bank of the St. Lawrence is naked, and from twelve to thirty feet high, with a gradual descent towards the end of the island. In the opposite direction (toward Lachine) it is very low, the land between the ridge just described and the river (a large triangular space) being marshy, but still with small embankments, indicative of water courses, which have once insulated the southern angle of the island. This flat has been chosen as the route of the canal between Montreal and Lachine, now in operation, to within half a mile of the former place.

This topographic notice may suffice for the geological details now to follow. A tolerable idea of the population, agriculture, and scenery of the island, may be collected from the writings of the meritorious Bouchette, and those of Lambert and Hall.

The environs of Montreal abound in geological facts of great value. The lowest rock is a trap, of a kind unique in the Canadas. By its peculiar composition, (which includes all the ingredients of granite,) and by its associations, it illustrates in a beautiful manner the affinity existing between the formation of which it is a member and the primitive class in general. The mountain of Chambly, sixteen miles east by south, affords the nearest of the older rocks in place. The extended trapose ramifications which it has projected into the superincumbent horizontal layers of limestone, without injury or displacement accruing to them, are very remarkable appearances, and to me inexplicable, except by supposing parity of age, an opinion making this rock, junior to the other inclined strata of the St. Lawrence, which are evidently of a date long anterior to this limestone. An opportunity is here furnished of examining the line of union of rocks extremely dissimilar in their materials, and in their origin also, according to prevailing theories. We shall find the limestone and its

organic remains (numerous and sometimes new and rare) unchanged, although in contact with, imbedded in, and even impregnating the trap.*

The deposits which I have called alluvial, but which were rather thrown down during the existence of vast inland seas, after the last deluge, may lead to useful inferences from their form and connexions, and from the nature and variety of their contents.

The fixed rocks of this district may be enumerated as follows:—A very compound trap constitutes the largest part of Montreal Hill, and appears in great quantity in the plains on its south. Besides emerging in the route of the Lachine Canal, a rapid visit enabled me to detect it in unstratified rock masses, which just escape above the herbage, in the common of La Prairie, a quarter of a mile west of the village, (six miles from Montreal) a mile south of the parish church of Longueil, (three miles east of Montreal) and on the banks of the St. Lawrence, west of, and near the same church. It occurs in a similar manner on the river Richelieu, (twelve miles south-east of Montreal) for one or two miles about Col. de Salaberry's Mills. Rolled fragments of this rock abound every where in the large area included by the towns of Montreal, Chambly, and St. John's, and extend southward at least twenty miles above the foot of Lake Champlain, even to the Genesee country, in a southwest direction, and up the St. Lawrence, nearly as far as Prescott, in Upper Canada. At the lower end of the Vaudreuil ferry, on the Lake of the Two Mountains, the fragments of trap are so plentiful and angular, (1819) that I suspect it occurs in place not far from thence.

Near Montreal, the trap supports, and traverses in direct contact, a conchiferous limestone, which floors nearly the whole island, as well as can be ascertained, through its

* Chambly Mountain, sixteen miles east by south, affords the nearest primitive rock in place.

plentiful soil; and is best brought into view about that town, and at the rapids of the Reçollet, and other portions of the Rivière des Prairies. At a distance from the hill, it probably rests on quartzose conglomerate, or sandstone; as on the former, are based some of the islets in the Lake of the Two Mountains, and the isle of St. Helen. Quartzite sandstone discovers itself at the Cascades, St. Anne's, and in the bed of the Lachine Canal.

The trap may be said to consist chiefly of crystalline hornblende, largely mixed with quartz, feldspar, mica, and angite. The accidental minerals are those characterising this order of rocks, as zeolite, &c. Except where it assumes the form of dykes or veins, as is common in the plain about the hill, it is massive, and usually much weathered. On the summit of the hill, and sometimes elsewhere, it rises above the vegetation in naked flattish mounds, closely compacted, and seldom exceeding five yards in diameter. In the small ruinous ledges and cliffs, it is fissured perpendicularly, and rent by cold, into large cuboid blocks. When quartz enters into the composition of the trap in quantity, it becomes schistose, but I have never observed real stratification.

The varieties are very numerous, but may all be derived from four principal forms, running into each other without apparent order, and occupying indiscriminately all levels. They do not only furnish a convenient mode of classification, but also represent the kinds predominating. Of the four, the two forms placed first in the following sketch are perhaps the most plentiful. The magnet is not affected by any, except when iron is visibly present.

The first form consists of promiscuously aggregated, shining, black prisms, of hornblende, from half an inch to three inches long, sometimes pure; and so mutually compressed as almost to disappear; but more frequently white or ferruginous masses of glassy feldspar and quartz, mixed in various proportions, are interposed, so as to give the whole a strong re-

semblance to sienite. This white compound, disintegrating by the weather, falls out, and renders the crust of the rock vesicular. Copper-coloured mica, in single scales, or in nests, is common in this variety, and now and then, though rarely, in great quantity. Small druses often form in the interstices of the hornblende crystals, lined with small crystals of feldspar, (white or colourless, transparent, hexahedral, tables) quartz, pale green epidote, (granular or in stellular, radiating, acicular crystals) white zeolite, (in divergent, coarse, acicular crystals, terminally superimposed,) and rarely a small weathered rhomb of chabasite. Cubic iron pyrites is common, and spicular iron ore in confused crystallization, as a coating. This form is met with on the summit of the east division of the hill, above McTavish's Tomb, on the middle of its north and west flanks, and the greater part of Mount Trafalgar, especially the lower. On the northeast declivity of Mount Trafalgar, and on a cleared hummock on the east division, near the west road to St. Catharine, the crystals of hornblende arrange themselves in continuous lines or bands, from a sixth to half an inch thick, and sometimes several feet long; with occasional cross rents. They are parted by the mixture of quartz and feldspar above-mentioned: forming, of course, similar bands, but white. I have seen this curious structure in short spaces only, and am thence unable to state its extent or direction. It is the more remarkable, as occurring among rocks in which any thing like order seems studiously avoided. It would appear to indicate that the mass has consolidated during motion. This kind affects the magnet.

The second form exists in most parts of the hill, and in the route of the Lachine Canal, and is well marked in the low cliff above McTavish's Tomb. It is black, or brownish black, opaque, homogeneous, rather fine-grained, with blunt edges. It yields a gray streak readily to steel. Its specific gravity is that of trap rocks generally. The specimens taken from near the west road to St. Catharine, and in other places near

calcareous strata, effervesce slightly, though distinctly, on exposure to acids. It is sometimes dotted with crystals of white glassy feldspar, which, having increased to a good size, in one case converted the mass into a porphyry.

The third kind prevails as well on the hill, as in the veins of the vicinity soon to be noticed. It is on some occasions scarcely to be distinguished from the black trap of the Sabine country, near Rome, containing solitary crystals of augite, which I have seen in the collection of Mr. Greenhough of London. It is the last described form crowded, (but sometimes only studded) like a porphyry, with crystals of greenish black augite, alone, or interspersed with basaltic hornblende; both of large size, and well characterized;* and in weathered masses, often showing their terminations. Among other localities, this form occurs on the declivity overlooking the race-course, where it is chequered with spots of granular epidote and white quartz. On La Prairie common, these augitic crystals are almost acicular, in a brownish trap; and also on the Lachine Canal, where the rock assumes a peculiar, and very handsome appearance. It is found in great quantity near the country-seat of Edward Gregory, Esq. but cannot now be examined, in situ, as it is covered by water. The large fragments strewed around, however, show it to be amorphous. It may be described as a confused assemblage of short needle-shaped black crystals, cemented together, to use a convenient phrase, by a fine mixture of pink feldspar and white quartz. It is in parts, interspersed with numerous round druses, averaging half an inch in diameter, lined with octohedral iron pyrites, rhombic and pyramidal calcspar, and green epidote in many but very small crystals. Mingling with these druses, without regularity of situation, and in con-

* The augite belonging to the *A. triumulaire*, of Haüy, as I learn from Dr. Troost, whose skill in practical chemistry and crystallography has laid me under frequent and pleasing obligations.

siderable numbers, (though commonly distinct) are spherical knots of pink feldspar, nearly pure, minutely crystallized, and filled with the acicular hornblende or augite of the general mass. The feldspar, it will be observed, is here pink. I met with a detached mass on the north side of the homogeneous trap, traversed by a vein two inches thick, of red feldspar.

Judging of the quantity of the trap met with, in the excavation of the Lachine Canal, by what is thrown out, it is very considerable. It is principally of the second, or compact kind, and is massive; rarely in veins, when it might be visible in the sides of the canal, as in fact it is, not far from the bridge at the west end, and at about three miles from the same end. The third form, when penetrating the limestone in veins, effervesces slightly with acids, and even contains well preserved *terebratulæ*, covered with a ferruginous crust, and surrounded by crystals of basaltic hornblende.

The fourth form abounds most near the limestone, at the sides of the eastern division of the hill, and on the higher parts of the very rough northeast flank of Mount Trafalgar; where it graduates, in passing downwards, through the homogeneous into the crystalline black form. It can, indeed, scarcely be called a trap; although forming part of the same deposition with the other portions of the hill. It cannot be distinguished, in carefully selected hand specimens, from the sienite of the summit of Peek Island, in Lake Superior; and with some difficulty from an amphibolic granite, from near Rice River, in the Lake of the Woods. It is a mixture, occasionally fine, of white or transparent feldspar, white crystalline quartz, and a little copper-coloured mica, often in nests. In this granite-like rock, prisms of hornblende are scattered at random, sometimes mere dots, or acicular; but at others, one or more inches long, and of corresponding breadth. As has been mentioned above, this form, by an augmentation of its hornblende, passes into perfect trap, and, on the other hand, as frequently, wholly loses the imbedded crystals in question.

white cement often contains carbonate of lime. When black and white ingredients are distributed with some uniformity, and in equal quantity, their strongly contrasting colours give great beauty. It often traverses the other forms of trap, in broad and straight, tapering bands, which issue in large irregular masses, whose precise relation to the surrounding rocks happens to be hid by vegetation or debris. The four forms of trap now sketched, together with their various gradations, occur in the veins or dykes which form an angular feature in the geology of the environs of Montreal. The second, or homogeneous kind, is most abundant; it is here protected from the elements by a ferruginous coating, and breaks into thick oblong slabs, with sharp, rhomboidal edges. I do not recollect the fourth form to exist elsewhere. Near the north end of a limestone quarry, a few hundred yards north of the race-course, there is a dyke of a position I have not observed on the hill. It consists of a material passing into powdery, cement, white and green, (each colour predominating in patches) which contains numerous very marked crystals of basaltic hornblende, distributed conditionally, but equally, and not often confluent. The cement is principally calcareous; the remainder being green earth, which frequently coats the crystals.

These dykes are derived from the hill. The presence of vegetation and of soil, prevents our tracing them throughout their source; but their origin is betrayed by the identity of their materials with those of the rock of the hill, by the use of the majority, and by their being detected in several places issuing thence, and from its immediate neighbourhood.

Mr. Macculloch, in his account of the group of trap islands on the west coast of Scotland, describes several large accumulations, dépôts, as it were, of amphibolic rocks, from whence veins proceed in all directions for several miles into adjacent strata. The form and position of the ramifica-

tions now under consideration, may be understood from the following observations.

Horizontal shell limestone, floors, as has been already stated, the plain surrounding the hill; and without the least derangement* invests its trap masses, to a variable distance, from the summit of from one hundred and fifty to three hundred and fifty feet, the lowest of these elevations being on the north, and the highest on the south flank of the east division.

From the hill, as from a centre, there pass in all directions into the limestone, with a remarkably straight, unchanging course, a great number of dykes, arms, or veins, of the composition stated above; and perpendicularly, or nearly so. They have been traced northeastwardly, for a mile and a half. Those at Lachine may originate in the trap contiguous to them. In the race-course, which is a level piece of ground, full of old and new quarries of limestone, no less than fourteen of these veins have been counted. They are best seen about the middle, and near the hill, from whence they advance just above the grass, like the base of long, ruined, walls. The most common direction on the race-course is east; the deviations being usually trifling. They dip north at a very high angle. At the northeast corner of the course, two veins cross, but the place of intersection is hid by soil. A little to the south of the stand a vein runs north north east. In the quarry north of the course, two contiguous dykes† also run north north east, that direction leading to the hill. The same is the case with another vein, in a pine wood, two thirds of a mile north of the course; and a second vein, close at hand in the same wood, passes north by east. Of three in Williams's limestone quarry, (about one and a half mile north east of the hill) that at the back of the house runs north, and another in

* Except near a deserted house on the west road to St. Catharines, where it is turned up edgeways in places: but perhaps not by the trap.

† The composition of one of these dykes has been given.

front, north east. They are compact, highly ferruginous, but occasionally in their route, (as is common) assume the porphyritic form described third. In one case the hornblende prisms are low and oblique, four sided, and at the same time few and small. The paste here is brown; the whole mass strongly resembling the trap on parts of the river Richelieu.

These veins have parallel sides, and are from one to three feet in thickness; but near Lachine, there is one fourteen feet thick; it is visible, however, for so short a distance, that its dimensions cannot be given precisely. They do not thin off, at least very sensibly. In fact, we cannot at present trace the same individual further than four hundred yards. Sometimes, as at the south east angle of the race-course, they seem to meet with an obstacle, and collect into an irregular knot, from ten to thirty feet broad, which again projects a number of tortuous ramifications: the straight course having been abandoned. These veins frequently subdivide, and again unite, enclosing lenticular masses of conchiferous limestone, and sometimes of large size; in all cases adhering to the trap, with the utmost firmness, and although the division is marked by a fine clear line, the carbonate of lime is detected in the vein by application of acids. These insulated fragments suffer no change except being a little harder; and contain *terebratulæ*, *encrinurites*, &c. whose state of preservation does not differ from that of the shells imbedded at a distance from the trap: even the nacre remains in some cases. These divisions are sometimes quite minute, and separate the limestone for short distances into thin ribbon-like laminæ, parallel to each other and perpendicular. Sometimes the trap has insinuated itself, horizontally in sheets, between the layers of limestone. This is beautifully exemplified in an abraded bank on the south side of the race-course, at the base of the hill. Here the upper stratum is horizontal trap of parallel sides, nearly two feet thick, and covered with earth. It rests on the limestone in its usual position, pushing through it

a vertical and very thin sheet of trap. A drawing, made very soon after meeting with this appearance, does not represent any displacement of the calcareous strata ; and I well remember, that the union between the two layers or veins of trap is perfect.

In the quarry five hundred yards north of the race-course, there is a vein eighteen inches thick, which is nearly horizontal. It is only seen for a few feet. Dr. Lyons, Surgeon to the British forces, an acute observer, to whom I am much indebted, met with a horizontal vein, on the south flank of Mount Trafalgar, overlooking the priests' house. The west and north-west parts of the base and sides of Montreal Hill, have not yet been sufficiently examined ; but I do not look for much information from thence, as they are employed in tillage, and, as far as I know, have not been excavated for quarries, &c.

I shall now proceed to give some account of the limestone overlying this trap, and receiving its ramifications. It is a portion of the great basin of secondary rocks of North America, whose outlines have been ably traced by Dr. James, in his account of the expedition to the Rocky Mountains, under Major Long. A more detailed description of its line of junction with the elder and inclined rocks of the dividing ridge of the vallies of Hudson's Bay, and the St. Lawrence, may be found in Volume VIII. p. 77. of the *American Journal of Science*. The particular form occurring in Montreal Island, and overspreading nearly the whole of it, extends into Lake Champlain and on the Richelieu on the south ; and northeastwards, down the St. Lawrence, as far as Cape Tourment, thirty miles below Quebec. Its south east boundaries have not been at all examined. We only know of the country south of the St. Lawrence, below Montreal, that it abounds in greywacke and clayslate, superincumbent on granite and gneiss. Westerly and southwesterly, it unites with the limestones of the Lakes, with which, if we are to judge by imbedded minerals, organic remains, and geological position, it is

cotemporaneous. The compact form is not to be distinguished from that of the north east end of Lake Ontario ; serving as the substratum for the adjacent parts of the State of New-York and Upper Canada.

The limestone of Montreal Hill is bluish black or bluish brown, without lustre, fine-grained passing into compact, easily scratched by steel, and of conchoidal fracture when free from shells. When exposed to the weather, it is divided into horizontal layers, from six to twenty-four inches thick, some of them containing silica in chemical combination (with increased hardness) ; and others chert in horizontal bands. How thick the strata are, at some depth beneath the surface, is very doubtful. This form of the limestone is well seen at McTavish's Tomb, on the west road to St. Catharine's, and on the north of the hill at the base : every where full of the organic remains of the level country. The limestone of the race-course, so traversed by dykes, is in all respects similar to that of the hill.

The small quarries scattered over a field north east of the race-course, and often alluded to already, are nearly on the same level with those of the latter spot ; but are perhaps two feet lower. They are only opened to the depth of nine feet of rock. Of this, the upper third is a brown, knotty, disintegrated, calcareous shale, greatly charged with iron in the form of carburet and pyritic forms. The lower two thirds, by a rapid, but not abrupt transition, consist of layers of bluish gray and grayish brown limestone, from eight to thirty inches thick. These are highly crystalline, in shining rhomboidal masses, which average one-sixth of an inch in diameter, and lay no trace of organization. Williams's Quarries present the same appearances as these.

The limestone on the north of the island, in the quarries and on platforms along the Rivière des Prairies, is nearly the same as the crystalline species of the quarry adjacent to the race-course. The organic remains are the same, but where I

observed it there was a tendency to the granular form. Some of it is shaly. The difference in level must be very small.

The calcareous rock, which has been cut through in forming the canal between Montreal and Lachine, is only seen in the three and a half or four miles nearest the west end. It is about on the same plane with the St. Lawrence. The ragged edges of the upper and northern strata, above described, are concealed by the large alluvial bank girding the hill. The limestone of this locality varies in its external appearance. In the eastern part of the above distance, it is pale, gritty, and deficient in shells. I suspect the presence of quartz, but an accident has deprived me of the opportunity of testing it.

Proceeding westward, the limestone becomes bluish black, and softer; a pale brown granular variety then intermixing with it, by a sort of alternation; both containing large druses of very splendid crystals of dog-tooth, nail-head, lenticular, and curved rhomboidal calcspar. Their organic remains are the same. These pale and dark layers are in firm union, by a wavy, but still horizontal line, the black one being usually on the surface, and often azoophytic, while the inner brown parts are full of shells, and approach to the crystalline state. The limestone at the west end of the canal is all dark and shaly, but is unchanged in other respects. Very fine fibrous *arragonite* has been brought from hence, but I suspect from the trap. It is in veins an inch thick, consisting of two closely connected tables of equal size, one of which is white, with some degree of translucency: the other is hyaline, and almost transparent.

These limestones cannot now be examined, in situ, as they are covered by the water of the canal, and by the earth forming its sides; but the fragments lying around, may be sufficient for obtaining a pretty correct idea of their nature. These materials also indicate, that in certain parts at least, it here rests upon an indurated quartz rock, of very fine grain, black and brown in alternate stripes, (the former shade being derived from carbon) and sprinkled with dots of iron pyrites. The

dark variety predominates and runs into shale ; but of what kind I have not yet ascertained. This rock occurs near St. Henry's, and seems to be supported by the porphyritic trap with the handsome druses of calcspar and epidote. The island of St. Helen, which bears about north north east from the place where this quartz rock occurs, is based on a modification of greywacke, an extremely compact and hard conglomerate of granular quartz masses, both angular and rounded, green, gray, brown and black ; and varying in size from two inches in diameter to microscopic. The cement is green, and in sparing quantity. It contains, disseminated, iron pyrites, and some copper-coloured mica, the latter being plentiful in some of the fragments. I observed in it, one mass of colourless feldspar. This rock shows itself in a naked bluff, a few feet above the St. Lawrence, on the north east of the Barracks of the Artillery. I am informed, that it is either massive or divided into very thick strata.

I may place here the facts which have come to my knowledge respecting the sandstone of St. Anne. It presents itself on the shore of Lake St. Louis for two miles below that village, and at the rapids of the same name, on the north east of Isle Perrault, in thick horizontal slabs of light brown quartz sandstone, with ferruginous clouds and spots. It is hard, fine-grained for the most part, and seems to have little or no cement. It appears in large quantity at the Cascades, on the opposite side of this body of water ; but as far as I am aware, it is not seen in ascending the St. Lawrence, until we reach the neighbourhood of St. Regis, (fifty miles south west) as we learn from a printed report of Mr. Raymond, a surveyor, who found it underlying much of the St. Lawrence county, in the State of New-York. I have seen it, in the Thousand Islands, resting on gneiss, directly and unconformably. From these and other circumstances, I deduce a probability, that the sandstone of St. Anne is below the limestone of Montreal Island—a rock whose organic remains and accidental minerals

are yet to be stated. All its varieties furnish the same animal remains ; but no fossil vegetables have yet been found. They are chiefly sparry or granular casts of the common limestone. *Lingulæ*, however, and *terebratulæ*, frequently preserve their nacre. Of *trilobites*, the asaph genus is the most abundant, excepting perhaps the debris of very large *trilobites*, usually too comminuted to allow of the determination of the species ; but in the crystalline limestone of the quarries, they are larger, and are evidently caudal portions of the genus *Isotelus*, lately instituted by Dr. Dekay. Some of them, although representing at least one third of the animal, are only a quarter of an inch long. The asaphs approach nearest the species *caudatus* of Brongniart. I have found no entire *Calymene* : but many bucklers or heads of the Blumenbach species ; and some of them an inch and an half in diameter. They are found whole, in considerable numbers, in the vicinity of Quebec.

The fragments of *trilobites*, from Germany, and Llandillo in Wales, represented in fig. No. 6. &c. of Brongniart, occur plentifully here, and do not differ much from those of the above distinguished naturalist, in general outline and dimensions.* The front of the buckler is much more convex, remarkably so ; and has on each side, near the base, three very small transverse lines, (scarcely to be called depressions) corresponding to the sulci so strongly marked in the genus *Calymene*. There is frequently, but not universally, a very minute pisiform process on the centre of the front. The whole upper edge of the buckler is always surrounded by a very ornamental semicircular border (sometimes semi-elliptical) of punctures, placed in the meshes of a net-work in high relief, and arranged close together, in rays, passing perpendicularly from the buckler, and forming at the same time, when observed transversely,

* At Montmorenci, near Quebec, they occur much larger : rather exceeding one and a half inch in diameter.

curved lines, parallel to its upper rim or edge, excepting at the sides, where they diverge, leaving a space occupied by other lines of dottings, parallel to the former, but speedily terminating on the cheeks of the buckler. The lines which are complete from side to side, are four in number. The imperfect additional ones vary from two to four; the smallest and inner consisting of only two or three punctures. A plain edging includes the semicircle of punctures. (Vide Pl. XV. fig. 1.) In the beds of these casts, the places of the punctures are shown, by small conical elevations, and those of the ridges of the network by corresponding depressions.

Orthoceratites are met with, in all the kinds of limestone: those in the dark granular form, are sometimes almost as large as the celebrated specimens from Lake Huron, and vary from them in no respect. Small cylindrical casts of calcspar, which taper considerably, are common. Having no peculiarities of structure, they are only thought to belong to this family, on account of their being provided with a siphuncle.

Conularia quadrisulcata are rare, but have been found. They are described by Sowerby. Casts of *trochi*, *turbones*, *terebratulæ*, *producti*, *turbinoliæ*, *cellular madreporæ*, *corallines*, *retipores*, *flustræ*, are every where in great plenty. There is a beautiful variety of the *tubipore*, which occupies a knot in the calcareous strata; not confusedly, as is common, but in concentric circles, and placed perpendicularly in the rock, at some distance from each other. I do not know if the tubes communicate with each other. *Lingulæ* exceeding an inch in length are frequent at the west end of the Lachine canal, having the brown matter of the shell in fine preservation. The encrinital family is in astonishing numbers and variety; but they have not as yet been carefully studied. In May 1823, I met with a beautiful specimen of the column and stomach of the *E. moniliformis*; a variety of the stag's horn encrinite is not uncommon. The remains, which I last summer considered, (with others,) to be a fragment of the stomach of

a pear encrinite, from a specimen from Montreal, found by Mr. Lee, (37th infantry,) and from Lake Simcoe, found by myself, I have since met with, in a more perfect form, at the natural steps above the Falls of Montmorenci, near Quebec. It most probably does not belong to this family at all; but is a multilocular shell, resembling the *orthoceratite*. I am not now prepared to add further respecting it, than that it is straight or curved cylindrical, large in what we may *pro tempore* call the middle, and tapering gradually towards the extremities: which, by the by, have not been seen. Its septa are straight, (not sinuous,) transverse; and average six to the inch. In ten individuals no siphuncle has been discovered. My largest fragment is four inches long, by nearly two in greatest breadth.

The accidental minerals occurring in the limestone of Montreal, are in very small quantity, and few in number. They are confined to purple fluor, in plates, lining fissures, and as small cubes superimposed: yellow blende, in imbedded crystalline masses: and iron and copper pyrites, in druses and as coatings.

The alluvial ridge, which surrounds two thirds of this island, and is so distinct on the southern and eastern aspects of the hill, may be considered as an ancient embankment, in one of those vast bodies of water which were left by the last deluge; and which in the lapse of ages have undergone repeated subsidences, until they have assumed their present shapes and number. From whatsoever source this bank may have derived its materials, its course and form have been imparted to it by waters flowing nearly in the same direction as the Ottawa and St. Lawrence of the present day: but at an elevation which would give them an infinitely greater extent than they now possess. I have traced it for one hundred and sixty-five miles up the former stream, when I met with a barrier of sterile hills, through which it forces its way, leaving behind it the vast and sometimes fertile deposits in which Lakes des Allu-

mettes, Tamatsaming, &c. are placed. Up the St. Lawrence, and on its lakes, it is universal; but broken even into seven successive terraces, which is the greatest number I have seen. It is continuous, downwards, from Montreal towards the Atlantic Ocean, in one or more of these platforms, for three hundred and fifty miles to my own knowledge, and most probably, the whole distance of five hundred and eighty miles; frequently, however, interrupted by districts of rock, as I need scarcely add.

This alluvial deposit, in the immediate vicinity of Montreal, including the ridge and the marshy flat at its base, is composed of different ingredients in different places. On the banks of the river, and in the rear of the town, it is, at all levels, a coarse mixture of ferruginous sand, reddish clay, and gravel; full of large bowlders of primitive rocks,* and particularly abounding in large nodules of rusted black and brown limestone. Here and there, without regularity, there are very thin and partial beds of pure sand and gravel, in a horizontal position. The former, however, I have learnt, exists, as a very large and deep accumulation, at the east end of the canal, close by, unfortunately for its cheap and permanent construction. The masses of limestone found among these rolled substances, are always without shells: a remarkable circumstance in a district of conchiferous limestone. It is very shaly, but still not only weathers in its ordinary direction, but in concentric spherical layers, like the coats of an onion, a mode of division not to be discovered in sound rock of this nature; but I have observed, upon an extensive scale,

* Among the rolled masses of the fields and river banks, I have met with pale green coccolite in tabular spar, with yellow mica; dark green coccolite; fine granular, forming one third of a compound; together with black mica, and pink rhomboidal calcspar; a bowlder of tabular spar, white, and unmixed, weighing six hundred pounds. Dr. Lyons has met with well-marked rolled Labrador feldspar in the island of St. Helen, opposite the town of Montreal.

that all rocks, on the application of strong heat, as on exposure to the cooking fire of a Canadian voyageur, including trap, and its conglomerates amygdaloid, granite, gneiss, quartz rock, &c. &c. shale superficially, in slaty, lenticular, and often large fragments, without attention to natural cleavages. I do not intend to make any deductions from this fact at present. These calcareous nodules are frequent at the east end of the Lachine Canal, with the gravelly earth spoken of above; but in a mile or so west, on its route, (the exact distance my notes do not give) it is succeeded by a deep blue viscous clay, containing among other pebbles, small masses of the black limestone without shells. This blue clay (still continuing along the canal) is succeeded, at two and a half miles from Montreal, by a bed, cut through for one hundred yards, of very soft and flaky white marl, full of fresh water shells. It is covered for three feet by decayed vegetables, and has itself been penetrated for the same distance without reaching its under surface. This bed has limestone, in situ, close on its west. Its shells are in great numbers, and precisely those inhabiting the contiguous waters and great lakes. They are decomposed; that is, are soft, brittle, and white, but not at all impregnated with carbon, flint, or calcareous matters. *Planorbis bicarinatus*, *deflectus*, and *trivolvis*, *Melania virginica*, and *Physa heterostropha*, are about in equal quantities. The *Unio* is rare, and always in fragments. I met with a very delicate and small *Lymnæus elongatus*, similar, except in size, to the living shell in the Little La Croix river, leading to Lake Vermilion, on the north and west of Lake Superior. *Lymnæus emarginatus*, *Valvata sincera*, and *Cycas similis*, are also present. There are some pits on the north of Montreal Hill, from whence Dr. Lyons has brought fresh water shells, of the genus *Saxicava*, which I have found likewise in a streamlet on the Ottawa, one hundred and twenty miles west north west of Montreal, and five miles into the woods from

the river. The marl and shells just noticed occur at Grenville, on the Ottawa, fifty-five miles west from Montreal.

To return to the ridge :—As it leaves Montreal to the west, its bowlders gradually disappear ; and at St. Henry, we find it to consist of beds of sand, resting upon clay. The flat below it, east of St. Henry, on the road to Lachine, is composed of coarse gravel from primitive rocks ; while the neighbourhood of the latter village is buried under foreign masses, to the depth of thirty feet in some places.

DESCRIPTION of a new species of GROSBEAK, inhabiting the Northwestern Territory of the United States. By WILLIAM COOPER. Read January 10, 1825.

THE genus *Loxia* being restricted by the most eminent modern ornithologists to the *Crossbills*, the remaining species of granivorous birds having a conical, straight, and pointed bill, and which were arranged by Linnæus and the authors who have followed him as species of *Loxia*, are now all comprehended under the genus *Fringilla*. The number of species thus brought together is consequently very great ; but they present such a gradual passage from one character to another, that it is found impracticable to separate them into well defined and natural genera. In order to avoid, however, the inconvenience which would result from so many species being comprehended under one head, Temminck proposes to subdivide them into three sections, characterised by the forms of their bills, viz. *laticones*, *brevicones*, and *longicones*. This simple arrangement appears preferable to the multitude of artificial genera which some nomenclators have attempted to establish ; or it would perhaps be more convenient to consider

these sections as subgenera, under the names of *Coccothraustes*, *Fringilla*, and *Carduelis*, as suggested by Mr. Charles Bonaparte, in his judicious *Observations on the Nomenclature of Wilson's Ornithology*.* The first of these comprises nearly all the *Loxia* of authors which are not *Crossbills*, and to it must be referred the species which is the subject of this notice.

FRINGILLA VESPERTINA, (nobis.)

F. fronte flavo; vertice alis caudâque nigris; macula alarum alba.

DESCRIPTION. *Length* eight and a half inches: *bill* yellow; strong, conical, swelling, pointed, depressed above at the base where it forms an angle in the feathers of the front; the upper mandible turning a little downwards at the point, and slightly notched, edges of both sharp and cutting: *nares* roundish, partly concealed by the black vibrissæ: a narrow black line surrounds the base of the upper mandible: *front* and a band passing over and behind the eyes yellow; *crown of the head* black: *cheeks* brown: *throat* and *neck* olive-brown passing downwards into yellow, which is the colour of the *back* and all the *under parts of the body*, *flanks* and *tail coverts*: *lesser wing coverts*, *primaries* and *first secondaries* black; *greater wing coverts* and *inner secondaries* white on their lower half, forming a large white spot on the wing; the first three *primaries* of equal length and longer than the rest: *tail* of twelve feathers, slightly forked, entirely black: *feet* light brown.

Cabinet of the Lyceum.

OBSERVATION. In the natural series of American species, this bird should be arranged as the first of the series; being

* Journal of the Academy of Natural Sciences, Vol. IV. p. 39.

intermediate between the *F. coccothraustes* of Europe and the *F. cardinalis*. To the former of these, which is the type of the subgenus, it is nearly allied, but is considerably larger, besides other differences, as the description given will show.

The specimen from which this description is taken, was sent to the Lyceum from Sault Ste. Marie, near Lake Superior, by Mr. H. R. Schoolcraft, and is labelled *Paushkundamo*, the name given it by the Chippewa Indians. Mr. Schoolcraft has since favoured me with the following account. It is a little singular that the meaning of the Chippewa name should so nearly coincide with that of the subgenus in the language of the system.

"*Paushkundamo*." This word is derived from the Chippewa verb *paushka-un*, to break. The termination indicates the object acted on, and is in accordance with one of the rules of their language, which permits the formation of compound words from a verb and substantive, dropping one or more syllables of each for the sake of euphony. The word *paushkaun* is the *animate* form of the verb, and is used only in particular reference to soft, fleshy, or vegetable substances, as a fly, a berry, &c. The word will therefore admit of being rendered *fly-breaker*, *berry-breaker*, &c.

"This bird appeared about Sault Ste. Marie, M. T. during the first week in April 1823. The individual under examination was shot on the 7th April, in the *evening*. An Indian boy was attracted into the woods by its peculiar, and to him strange note. There were a few birds in company: they were seen for a short time about the place; but none have since appeared. The species is said to be common about the head of Lake Superior, at Fond du Lac, &c."

Major Delafield, in the execution of his duties as agent of the United States for boundaries, met with the same bird in the month of August 1823, near the Savannah river, north-

west from Lake Superior, and has obligingly communicated the following extract from his notes made at the time.

"At twilight, the bird which I had before heard to cry in a singular strain, and only at this hour, made its appearance close by my tent, and a flock of about half a dozen perched on the bushes in my encampment. They approached so near, and were so fearless, that my canoe-men attempted to catch them, but in vain. I recognised this bird as similar to one in possession of Mr. Schoolcraft, at the Sault Ste. Marie.

"Its mournful cry about the hour of my encamping, (which was at sunset) had before attracted my attention, but I could never get sight of the bird but on this occasion. There is an extensive plain and swamp through which flows the Savannah river, covered with a thick growth of sapin trees. My inference was then, and is now, that this bird dwells in such dark retreats, and leaves them at the approach of night."

OBSERVATIONS on the GENUS *SALAMANDRA*, with the anatomy of the *SALAMANDRA GIGANTEA* (Barton) or *S. ALLEGHANIENSIS* (Michaux) and two new genera proposed. By R. HARLAN, M. D. Read Dec. 27, 1824.

DURING my researches into the Linnean *Lacerta*, I found myself very much embarrassed by the confusion which exists in the present classification and arrangement of this department of zoology; the *Salamandra* have not unfrequently been confounded with the *Proteus* and *Siren*, and these latter described as the former; and in a few instances including individuals generically distinct from either. This confusion has been not a little increased by the late discovery of several individuals of this family, which cannot without violence be referred to any existing genera.

will be readily presumed, that it was only after consideration, and minute anatomical investigation extended variety of these animals, that I have ventured to give city to the following observations.

1e *Siren*, the *Proteus*, the *Amphiuma*, the *Triton lateralis*) the *Salamandra gigantea* (Barton) or *Alleghaniensis* (Hauks) must form a family of reptiles distinct from all others, and these will again be naturally separated into such as have branchiæ, and such as have none ; all being furnished with nostrils and spiracula. Those which are provided with persistent branchiæ having the skull composed of many separate bones, as the *Proteus* and *Siren*—those which have no branchiæ, without branchiæ or gills, having the skull composed of a solid piece, as the *Amphiuma* and *Salamandra gigantea*. 2e *Triton lateralis* must not be confounded with the *Triton* of Laurenti, or water-newts, (the *Salamandra aquatica* Cuvier) as, in the first place, these animals are furnished with five toes to the posterior extremities and four to the anterior : the *Triton lateralis* having only four toes to each extremity. 3d. The *T. lateralis* is furnished with persistent gills—the *Salamandra* these organs are deciduous. 4d. The *T. lateralis* has one rib less than the *Tritons* of Laurenti, and *Salamandra* proper.

his difficulty could not escape the minute observation of Say, who in his paper on the *Triton lateralis* (in the first . Major Long's Expedition) expressly states : " These four species [viz. the *Axolotl* or *Siren pisciformis* (Shaw) *tetradactyla* (Lacepede) the *Sirène operculée* (Beauvois) the *Proteus Neo-Cæsariensis* (Green)] might with propriety be separated from the genus to which they are referrible

Triton, as a generic term should be discarded, it having been originally used by Laurenti, who mistook the larvæ of *Salamandra* for perfect animals, as was remarked by Cuvier, in his essay " Sur le Protée." (Voyage de M. Humboldt et Bonpland.)

in the present state of the system, and placed in a separate genus, the external characters of which will be the same as those of *Triton*, with the exception of the persistent branchiæ.* Its proper station will doubtless be intermediate between *Triton* and *Proteus*, but far more closely allied to the former."†

The animal described as the *Sirène operculée* by M. P. de Beauvois, (in the 4th Vol. of the American Philosophical Transactions,) is furnished with four legs, and five toes to the posterior feet—it is merely the larva of a *Salamandra*, similar to that described by Professor Green, in Vol. I. of the Journal of the Acad. Nat. Sciences of Philadelphia, as the *Proteus Neo-Casariensis*.

But the animal described by Lacepede, (in the 10th Vol. of the Ann. du Mus.) is worthy of particular notice. He named it "Un Protée, ou Salamandre tetradactyle;" and states that the place of its habitation is unknown, and the internal structure was not examined. It is furnished with four legs and four toes to each foot, with persistent branchiæ; the form of the tail, and general external appearance, to judge from the plate, resembles the *Triton lateralis*; but both jaws possessed a double row of teeth, and a collar formed by a fold of the skin partially surrounds the superior portion of the neck, immediately anterior to the branchiæ. I have little

* To this exception he should have added, that all the species he has mentioned, excepting the second, have five toes to the posterior extremities.

† I am happy in having it in my power thus early to correct an error I have made in detailing the anatomy of the *T. lateralis*, in the paper above alluded to, wherein I have stated that "the olfactory apparatus is similar to that of fishes, having no posterior nares, &c." This is incorrect. In examining lately a specimen of this animal, I observed these openings, which are situated in the space between the two rows of teeth at their posterior termination; they are covered over by a valvular production or duplication of the lining membrane of the mouth, which circumstance misled me.

of its being a distinct species of the same genus described by Mr. Say as the *T. lateralis*.

The *Salamandra tridactyla* (Lacepede) is furnished with, and possesses other characteristics of the lacerta (Vid. d'Hist. Nat. Art. *Sal.*) The animal from the North American Lakes, which Dr. Mitchill has described (in the vol. of Silliman's Journal, and more at large in the 7th of the same) as a *Proteus*, and which he has strangely named with the *Salamandra Alleghaniensis* (Michaux) or vulgarly termed "Hell-bender," and "Tweeg," in Dr. Barton's description of the same, (Vid. Barton's Tracts, Vol. 1, as in reality no affinity either to the *Proteus* or "Hell-bender," but is simply a variety of the *T. lateralis*, with which the animal from Lake Champlain, described by Schneider in his *Historia Amphibiorum*, Fasc. 1st, p. 50.) as early as specifically corresponds,* notwithstanding Daudin erroneously supposed it to be the larva of the *Triton Alleghaniensis* and Mr. Say has since supposed it to be the larva of the *Salamandra Alleghaniensis*. (Latreille, Vid. Vol. I. Acad. Sciences, notes on Professor Green's paper on the American Salamanders by Mr. Say.)

The *Salamandra Alleghaniensis* is, I think, improperly placed among the *Salamandræ*. It differs in general form and position; it wants that remarkable characteristic of the *Salamandræ*, viz. "Anum habent vulvæ muliebri simillimum." Mr. Say, after describing the Mexican *Axolotl*, remarks, "from which I conclude, that the *Axolotl* of the Mexicans, or *pisciformis* of Shaw, is nothing more than the larva of a gigantic *Salamandra*, probably precisely the same as the *Salamandra Alleghaniensis* of Michaux." But in this he was mistaken; the *Axolotl* possesses every characteristic of the form of a *Salamandra*, though probably of a different species

* See page 57 of this Volume.

from any existing in our waters, as it differs in the number of its vertebræ and ribs; and notwithstanding it has not yet been observed in a perfect state, or without branchiæ, (both specimens examined by Cuvier were young animals.*) Whereas, the *Salamandra Alleghaniensis* has never been observed possessing gills, although examined when quite young; they exist in great numbers in the Alleghany river; and I possess a specimen, a few months old, in which there does not exist the least remnant of branchiæ, and as the *Salamandræ* are supposed to carry their branchiæ at least for the term of one year, it is certainly fair to conclude that these appendages do not constitute a part of the organization of this animal; which alone is sufficient to separate it from the genus *Salamandra*. But a comparison of the anatomical structure of these animals, places the subject beyond a doubt; and as no history of the internal fabric of the *Salamandra Alleghaniensis* has ever appeared, the following detail cannot be devoid of interest.

I received, through the politeness of Mr. Poe of Pittsburgh, whose zeal has in more than one instance advanced the cause of science, two specimens of this animal: one very young, the other of a middle size, which was brought alive as far as Baltimore, when it was killed by placing it in slightly brackish river water. They are sometimes observed to have attained two feet in length.

Total length of the present specimen, twelve inches. From the vent to the end of the tail four inches; *vent*, a small longitudinal rima, rather depressed; girth, four and a half inches; width of the head, one and a half inches.

* In a late notice of the *Axolotl*, by Sir E. Home, it is stated that this animal is proved to be a perfect animal, and no larva, as the *organs of generation are developed*. The same argument would prove the tadpoles to be perfect animals, the organs of generation being equally developed in them all—as was demonstrated by Cuvier, in the year 1800. (Vid. Obs. sur les Tetards, in Humb. Voy.)

Organs of Sense. The eye is smaller proportionally than in the common Salamanders, in which respect it resembles the *Axolotl*; the ear, like that organ in the Salamanders, does not appear externally.

Organs of Digestion. Lower jaw furnished with a single row of teeth; upper, with two concentric rows, the interior semicircular, at the posterior terminations of which are the patulous openings of the posterior nares. Tongue free at the anterior portion; the operculum half way between the fore-leg and the posterior termination of the rictus of the mouth; opercular cartilages, three in number, the opening between the two inferior;* their posterior extremities, unlike the Salamanders, are free, or not united to the vertebræ; anteriorly they are united by synchondrosis to the inferior cornua of the os hyoides; the bones of the tongue differ widely from the same in the *Salamandra* and *Proteus*, which will be comprehended by reference to the plate, and comparing them with the figures in the elaborate works of the Italian naturalists: "Descrizione Anatomica delle Salamandra aquatiche," by Dr. Rusconi, and "Del Proteo anguino, monografia da Configliachi," much better than from description; the parts were sketched, in situ, immediately after dissection, by Mr. T. R. Peale, to whom I am also indebted for two spirited drawings taken from life; one of this animal, the other of the *Triton lateralis*.

The œsophagus is short, and folded longitudinally; the stomach is large, and for the most part membranous, but becomes muscular near the pylorus; it contained two pebbles about the size of the finger-end, and two others much smaller, also the claw of a fresh-water lobster, which the animal had

* In this respect the *Salamandra Alleghaniensis* agrees with the *Amphiuma*—in both, the operculi exist through life. In the *Salamandra*, and other batracians, on the contrary, these openings do not exist in the adult state.

swallowed without comminuting. The intestinal canal is large, and thrown into numerous folds, and terminates finally in an unusually large cloaca. The liver is oblong, and divided into two lobes, between which is situated the gall-bladder, of a large size, whose duct opens into the intestine two inches from the stomach. The spleen is of a reddish yellow colour, and situated in the centre of the mesentery.

Organs of Respiration. Glottis opens one inch and a half from the extremity of the snout, (it is a mere rima.) Trachea membranous, one inch in length, dividing beneath the clavicles to form two lungs, three inches in length. Lungs vesicular, elastic, vascular: in structure resembling those of the *Testudo*; they lay posterior to the other viscera.

Organs of Circulation. The vena cava inferior, traverses the liver, and enlarges previous to emptying into the auricle, which is single, and very large; this empties immediately into the ventricle, which is also single, and whence a large fleshy artery goes off, as in fish and the larvæ of Salamanders, but the distribution of this artery differs from the above-mentioned animals; after running three tenths of an inch, it forms a sac, which gives off three branches, viz. one to each lung, and a larger one which continues down the spine to nourish the whole body.

Remaining viscera. The urinary bladder, testicles, and kidneys, resemble very much those organs in the *Amphiuma*.

Osteology. Skull composed of a solid piece of bone, articulated by two condyles to the atlas. From the head to the pelvis there are nineteen vertebræ, and eighteen ribs on either side, (or rather moveable rudiments of ribs, similar to the other individuals of this family,) the atlas only, as in the Salamanders, being deprived of this appendage. Having compared this part of the osseous structure with the analogous genera, I shall give the result in a tabular form.

the head to the pelvis there exists in the	Vertebræ	Ribs on each side.
<i>salamandra Alleghaniensis</i> (Michaux), <i>grisea</i> (Barton) - - - - -	19	18
<i>salamandra rubra</i> (Daudin)* - - - - -	19	18
<i>salamandra lateralis</i> (Say) - - - - -	19	17
<i>Amphiuma</i> or <i>Siren pisciformis</i> (Shaw)† - -	17	13
<i>Proteus anguinus</i> - - - - -	30	7
<i>Lacerta lacertina</i> - - - - -		7

the rudiments of ribs in the skeleton of the *Proteus anguinus* described by Cuvier, (in Humboldt's Voyage) are represented as moveable, or continuous with the transverse process, as they are represented as moveable rudiments in the skeletons of the *Salamandra* given in the works of Configliachi and

the skeleton of the *Salamandre terrestre*, figured in Sonnini's edition of the *Histoire naturelle des Salamandres de France*, and which is said to have been taken from Latreille, (Histoire naturelle des Salamandres de France,) is represented with only fifteen vertebræ from the head to the pelvis, and fourteen ribs on each side. In a large *Salamandra*, (*Lacerta lacustris* of Lin.) whose skeleton I possess, there are sixteen vertebræ from the head to the pelvis, and fifteen ribs. In the *Amphiuma* there are thirty-two vertebræ to the tail, including the sacral, and in all forty-eight; though the extreme end of the tail appeared to be

the figure of the skeleton of the *Axolotl* (in Humboldt's Voyage, &c.) is represented with sixteen vertebræ from the head to the pelvis, and fifteen ribs on each side; thus making the figure to disagree with his description, as is, as expressed in the table—"The *Siren*," according to the same author, "has ninety vertebræ from the head to the pelvis, the anus being situated to the forty-fifth. The *Salamandre terrestre* has thirty-eight, the *Salamandre aquatica* nearly forty vertebræ in all; the pelvis is supported sometimes at the thirteenth, sometimes at the fifteenth, in the *terrestre*; and at the fourth or fifteenth in the *aquatica*. In the *Siren*, eight vertebræ (from the first to the ninth) are furnished with false ribs. In the *Salamandra terrestre* there are twelve or thirteen ribs; in the *Salamandra aquatica* only six. In the *Proteus*, there are fifty-six vertebræ in all, the pelvis is situated to the thirty-first; only six vertebræ, counting from the second, have ribs." The number of vertebræ and ribs in the aquatic *Salamandra* differs in different species.

Rusconi ; the latter author reckons seven ribs from the third to the ninth vertebræ—the former, six, counting from the second to the seventh vertebræ. I am disposed to think *Configliachi* is correct, and that the errors noted above in *Cuvier's* figure of the *Protean* skeleton, arose from its having been badly cleaned, as in the view he has given of a separate vertebra enlarged, he has represented the rib as distinct from the transverse process, and bifid at its articular extremity, nearly similar to that of the *Salamandra*.

The pelvis of the *Salamandra Alleghaniensis* is somewhat or nearly similar to the *Salamandra* ; a small process is given off laterally from the transverse process of the twentieth vertebra, which may represent the os ilium ; from which another process (the ischium) descends to unite with the pubis ; at the junction of the two last, the os femoris is articulated.

There are twenty-four vertebræ to the tail, including the pelvic or sacral, which makes in all forty-three for the *Salamandra Alleghaniensis* ; both surfaces of the bodies of the vertebræ are remarkably concave, which in the recent animal are filled with a ligamento-cartilaginous ball. The articulating surface of the transverse process is very oblong vertically, the head or articulating surface of the rib is consequently very broad ; this structure differs from those *Salamandra* with which I have compared it, (*viz.* *Salamandra rubra* and *aquatica*) in them the head of the rib is bifid and articulated by two separate surfaces to the transverse process, which is also bifid, but approaches the manner in which the ribs are articulated in the *Siren*. Nothing remarkable or characteristic was observed in the remaining portions of the skeleton.

It follows from the above detail that the *Salamandra Alleghaniensis* differs widely from the *Salamandra* in the respiratory organs—in the circulating system—in the digestive apparatus—and, finally, in its osteological construction. I may here remark, that I was not surprised to observe the internal fabric of the *Alleghaniensis* so characteristically distinct from

all the other animals of this family—it only confirms us in the opinion that anatomy alone can teach us the true affinities and relations of organized beings.

Naturalists are familiar with the dispute between the French and Italian zootomists concerning the *Siren lacertina*: the latter declaring it as their full conviction that this animal is the larva of some reptile, the genus of which is as yet unknown, and which will differ from its larva in not possessing gills, &c. Whilst Cuvier maintains that the *Siren* is a perfect animal, permanently amphibious.

I must refer to the works of these respective naturalists, as above quoted, where this subject is treated of in detail; and shall briefly remark, that the arguments of the Italian naturalists tending to prove the *Siren* a larva, from its anatomical structure, are shown to be groundless by a comparison of the internal fabric of that animal with the anatomy of the *Salamandra Alleghaniensis*, as above detailed.

With all due deference and respect for those very able anatomists above quoted, I may be permitted to correct an important error into which they have both fallen in the anatomical descriptions of the larvæ of the *Salamandra* and of the *Siren*.

I quote the words of the Italian naturalists :—" All zoologists, including Mr. Cuvier, now admit that frogs first receive air into the mouth through the nostrils only, and from thence force it into the lungs by an action resembling deglutition. But neither the *Proteus* nor the *Siren* are able to respire in this manner; for the nostrils in the former do not open into the mouth, but beneath the upper lip; and in the *Siren*, M. Cuvier observes, ' les narines, simplement creusées sur les côtés du museau, ne pénètrent point dans la bouche.' Neither do these animals respire in the manner of serpents, as they are destitute of (true) ribs." And further on, the authors continue—" Between the *Siren* and these larvæ (*Salamandra*) there is the greatest resemblance, not only in regard to the branchial

arches, but also to the nostrils; for in the *Siren*, as well as in these larvæ, the nostrils do not communicate with the mouth.¹³

I present to the Society a specimen of the larva of the *Salamandra rubra*, (Daud.) in which I have passed a slender probe through the nose into the mouth by the posterior nares, on one side, and have allowed the opposite side to remain untouched, in order that the committee who are to examine this essay, may at once convince themselves of the accuracy of this statement, which I hope they will look into with more than usual scrutiny. It was indeed with some difficulty I found the posterior nares in this larva, as they open in the form of a small slit, which was closed by the lining membrane of the mouth; they are situate rather external to the posterior termination of the interior row of teeth.

I next proceeded to examine this structure in the *Siren*, two specimens of which are in the Philadelphia Museum; the smaller of the two being very young, it was not easy to pass a probe through the nostrils, though the posterior nares are visible; but in the other, which is about one foot in length, I passed a probe of considerable size through the nostril, into the mouth, down the throat, where I allowed it to remain, for the convenience of those who may wish to examine the same.

I experience the less hesitation in making these strictures, and corrections, as the error is one into which I was myself betrayed, in my description of the anatomy of the *Triton lateralis*. These openings in the *Siren* are situate on the outer side of the teeth.*

The *Amphiuma*, the *Siren*, the *Proteus*, and the *Salamandra*, will be acknowledged by all to constitute separate genera.

* In the Dict. d'Histoire Nat. Article *Siren*, by Professor Boie, it is stated that "the *Siren* is clothed with scales, and furnished with claws." It is only necessary to notice these errors, inasmuch as they may confuse the student.

ralis and *Alleghaniensis* not belonging to any of these, require appropriate generic names, in order to introduce that independent station in the systems, to which they every claim. As the most prominent feature distinguishing the *T. lateralis* from the *Salamandra* is its persistent gills, we have preferred a name significative of the same. *Alleghaniensis*, on the contrary, being characterized by retention of branchiæ, the most appropriate name will be indicative of that circumstance ; the specific appellations sufficiently discriminative, must remain.

GENUS I. MENOBRANCHUS.

characters.—Persistent branchiæ ; two rows of teeth : upper, and one row in the lower jaw ; four-footed, five toes to each foot ; clawless.

anchus lateralis.—A black vitta from the nostrils passeth through the eyes, and dilated on the sides, becoming a line on the tail.


anchus tetradactylus.—Two rows of teeth in each jaw ; reticulation of skin, forming a collar on the superior part of neck, immediately anterior to the branchiæ.

GENUS II. ABRANCHUS.

characters.—Destitute of branchiæ at all periods of existence ; four strong legs ; five toes to the posterior, three to the anterior extremities ; the outer edge of the feet serrated ; two outer toes of the hind feet palmated ; clawless.

anchus Alleghaniensis.

Explanation of the Plates.

- MENOBANCHUS** *lateralis* - - - - Plate XVI.
ABRANCHUS *Alleghaniensis* - - - - Plate XVII.
Details of organization of *A. Alleghaniensis* - Plate XVIII.
Os hyoides and spiracular cartilages, Fig. 1.
Vertebræ, Fig. 2.
Upper and side views of the head, Fig. 3, 4.
Hind foot, Fig. 5.
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DESCRIPTION of a new Genus of Mammiferous Quadrupeds, the Order EDENTATA. By RICHARD HARLAN, M. D. Professor of Comparative Anatomy to the Philadelphia Museum, Member of the Am. Phil. Soc. &c. &c.

Read January 24, 1825.

On the 18th December, 1824, Mr. William Colesberry of Philadelphia, presented to the Philadelphia Museum of Natural History the interesting animal which forms the subject of the following pages. Mr. C. gave the following statement to Franklin Peale :—" The animal is a native of *Mendoza*, in the Indian language is named ' Pichiciago.' Menzies situate in the interior of Chili, on the east of the Cordillera, in lat. $33^{\circ} 25'$ and long. $69^{\circ} 47'$, in the province of Mendoza. It had been obtained on the spot, in a living state, and continued to live in confinement only a few days. Its habits resemble those of the mole, living for the most part underground; and is reputed to carry its young beneath the cloak with which it is covered; and that the tail possesses little or no motion."

It is to be regretted that the viscera and the greater portion of the skeleton of this animal had been removed before it came into my possession; and the gentleman who presented it to me, having left the city, precludes the possibility of regaining, at present, any further particulars relative to its habits, but the observations which I have been able to make from the examination of its exterior, together with the skull and teeth, all of which are in nearly a perfect state of preservation, establish the characters of the animal on the most solid foundation.

Cuvier, that justly celebrated naturalist, remarks: " In Zoology, when the teeth and jaws of an animal are given, the living structure may be readily determined; at least as far as relates to essential characters." The form of the tooth.

determines that of the condyle; the form of the scapula, that of the nails; just as the equation of a curve indicates all its properties; as in taking each property separately, for the basis of a particular equation, we might arrive, not only at the *ordinary* equation, but at all the other properties: so the nail, the scapula, the maxillary condyle, the femur, and all the other bones, taken separately, would indicate each other reciprocally; and beginning with either separately, we might, according to the rational laws of the organic economy, construct the whole animal."

It is thus, by a perfect knowledge of the laws of co-existence, to which the combinations of animals are subjected, the skull alone of the animal under consideration would have enabled us to determine that it belonged to a new, and non-descript genus.

The varied, magnificent, and multiplied collection of natural objects, in the Philadelphia Museum, drawn from every department of nature, displays in the strongest light the wonderful results to be obtained by the talent, industry, perseverance, and zeal, of an individual. The venerable octogenarian *founder* still lives, to contemplate with sentiments of pride and delight the colossal monument which has risen at his command; which will perpetuate the fame, and hand down the name of *Charles Wilson Peale* to the latest posterity.

On the present occasion, as on many others, I have been indebted to the Philadelphia Museum for the opportunity of making the clearest illustration of the subject of investigation. I have also to congratulate myself in the acquaintance of Mr. William W. Wood, a young but zealous naturalist, whose talents as a faithful delineator of nature, have only to be known, to be duly estimated.

The order EDENTATA includes quadrupeds destitute of incisor teeth, forming the last order of Cuvier's clawed animals. Although united only by a negative character, there exists some positive relations between them, particularly the large

nails which embrace the extremity of the fingers, and resemble more or less the nature of hoofs.

CHLAMYPHORUS TRUNCATUS.

Corpore, supra testâ coriacea, postice truncata, squamis rhomboideis, lineis transversis dispositis, conflata, subtus capillis albis, sericeis, oblecto; capite supra squamis testa dorsali continuis, adoperto; palmis, plantisque pentadactylis; unguibus anterioribus longissimis, compressis; marginibus externis, mucronibusque acutis; cauda rigida, sub abdomine inflexa.

DIMENSIONS.

	luch.
Total length - - - - -	5.2
Length of the head - - - - -	1.6
Breadth between the eyes - - - - -	.8
Depth of the posterior truncated portion of the shell -	1.3
Greatest breadth of the same - - - - -	1.8
Girth posterior to the shoulders - - - - -	4.
Length of the sole of the foot, including the nails -	1.2
Breadth of the foot - - - - -	.3
Length of the nails - - - - -	.2
Length of the hand - - - - -	1.4
Breadth of ditto - - - - -	.4
Length of the longest nail - - - - -	.7½
Length of that portion of the tail which is free, and curved beneath the body - - - - -	1.2

The shell which covers the body, is of a consistence somewhat more dense and inflexible than sole leather of equal thickness. It is composed of a series of plates of a square, rhomboidal, or cubical form; each row separated by an epidermal or membranous production, which is reflected above and beneath, over the plates; the rows include from fifteen to twenty-two plates; the shell being broadest at its posterior

half, extending about one half round the body; this covering is loose throughout, excepting along the spine of the back and top of the head; being attached to the back immediately above the spine, by a loose cuticular production, and by two remarkable bony processes (to be described hereafter) on the top of the os frontis, by means of two large plates, which are nearly incorporated with the bone beneath; but for this attachment, and the tail being firmly curved beneath the belly, the covering would be very easily detached. The number of rows of plates on the back, counting from the vertex, (where they commence) is twenty-four; at the twenty-fourth the shell curves suddenly downwards, so as to form a right angle with the body; this truncated surface is composed of plates nearly similar to those of the back; they are disposed in semicircular rows, five in number: the lower margin, somewhat elliptical, presents a notch in its centre, in which is attached the free portion of tail, which makes an abrupt curvature, and runs beneath the belly parallel to the axis of the body; the free portion of tail consists of fourteen caudal vertebræ, surrounded by as many plates, similar to those of the body; the extremity of the tail being depressed, so as to form a paddle; the rest of the tail compressed. The caudal vertebræ extend up to the top of the back, beneath the truncated surface, where the sacrum is bent to meet the tail. The superior semicircular margin of the truncated surface, together with the lateral margins of the shell, are beautifully fringed with silky hair.

Head: posterior half, broad, anterior half, before the eyes, tapering; the occiput is covered by the five first rows of the back plates, with which they are continuous; the occiput not distinguishable externally. The anterior half of the top of the head, is covered, first, by a row of large plates, five in number, which are firmly attached to the bone beneath; particularly the two outer;—secondly, by a smaller row, six in number, anterior to which, that is to say, the top of the snout, is covered with smaller plates irregularly disposed.

External ear, consists of a circular, somewhat patulous opening, directly posterior to the eye, surrounded with an elevated margin ; and communicating with a bony canal, to be more fully described hereafter. *Eye*, minute, totally black ; and, like the ear, nearly hidden by long silky hair. *Mouth*, the rictus small. *Nose*, the extremity of the snout is furnished with an enlarged cartilage, as in the hog ; the anterior nares opening downwards, at the inferior border.

The whole surface of the body covered with fine silk-like hair, longer and finer than that of the mole, but not so thick set. The anterior of the chest is large, full, and strong ; the anterior extremities, short, clumsy, and powerful ; the hair is continued for some distance on the palm—the phalanges of the hand united ; five powerful nails rising gradually one above the other ; the external shortest and broadest ; the whole so arranged as to form a sharp cutting instrument, somewhat scooped ; very convenient for progression under ground ; and such as must very much impede motion on the surface. Hind legs weak and short—feet, long and narrow ; the sole resembles considerably the human foot, having a well defined heel, which rests flat upon the ground, and being arched in the middle ; toes separate, nails flattened horizontally.

Skull. At first view, the bones of the cranium and face would appear to constitute one solid case, the remnants of sutures are indistinctly visible in some parts only. The cavity of the cranium is capacious ; the greatest breadth, which is from ear to ear, is one inch ; greatest depth five tenths ; length of the cavity, seven tenths. One of the most remarkable peculiarities of this skull, consists in the two processes of bone, above alluded to, which project obliquely, forward, upward, and outward ; from the os frontis, anterior to the cavity of the cranium, and directly above the malar bone ; giving to the front of the skull an aspect totally unique ; these prominences are hollow, communicating with the frontal sinuses, and must contribute in a great measure to enlarge the organ of smell ;

there exists a considerable concavity between them, which, in the recent state, was filled with an adipose, gristly mass, which served to unite the skull to the plates above. The snout commences anteriorly to these processes, and is rapidly attenuated and depressed. The ossa nasi are broad and strong, slightly arched transversely, extending anteriorly beyond the os incisivum, as does likewise the osseous septum narium. The zygomatic processes are laterally arched; a small pointed process, descending near the malar bone, (somewhat like that in the sloth); the zygomatic fossæ are large.

The labyrinth is protuberant, and occupies the usual situation at the base of the skull; joined to which is the tympanum;—to the last is attached a bony cylinder, stretching first upwards behind the zygomatic process of the temporal bone, around which it makes a sudden curve, and runs forward and upwards to terminate at the external ear. This structure, which I believe is peculiar to the animal before us, will be better understood by referring to the plate.

Lower jaw. Anterior portion shaped like that of the elephant, much elongated; the general form and proportion resembles very closely the lower jaw of the sheep, the base being considerably arched, and the curve at the posterior part, forming with the base nearly a right angle, projecting obliquely outwards: the base is marked by eight slightly elevated protuberances, occasioned by the roots of the teeth; the condyloid process is longer than the coronoid; in the sheep, this is reversed: the articulation at the glenoid cavity is such as to admit of great freedom of motion. Length of the base of the lower jaw one inch; length of the angle five tenths; greatest width two and a half tenths; width of the angle three tenths.

Teeth. Incisors, none in either jaw; molars, eight in number, on either side of the upper and lower jaws, all approximate; disposed in separate alveoli; the crowns of the two first only, approach to a point, and thus much resemble canine teeth; the six remaining are all nearly flat on the crowns;

their structure is simple ; a cylinder of enamel, of equal thickness throughout, surrounds a central pillar of bone, there being no division into body and root ; the lower half is hollow, the cavity representing an elongated cone. In the lower jaw, the teeth penetrate its whole depth ;—length of the teeth, about three tenths of an inch : two tenths of which are buried in the sockets—diameter, about one tenth. They are somewhat flattened on the sides, and in a slight degree curved externally, to be adapted to the shape of the jaw. The teeth of the inferior maxilla are directed forwards and upwards ; those of the superior maxilla are directly reversed in their direction, so that the crowns meet each other obliquely ; and the posterior margin of the lower teeth, and the anterior margin of the upper, present their angles to the object of mastication. (This structure is exemplified in Plate XXI. fig. 7.)

The remainder of the skeleton, with the viscera, having been removed previous to my obtaining a view of the animal, I am unable to give any further detail of the internal organization. It is fortunate that I have been enabled to make so complete a preparation of the skull ; this, with the external organization, which is well preserved, will enable me to establish its generic characters on the firmest foundation. To such as have made comparative anatomy the subject of their investigation, the above minute detail of this very extraordinary individual will enable them in some measure to anticipate the observations which follow ; they will perceive, at first view, that the animal before us unites in its external configuration traits peculiar to the genera *Dasypus*, *Talpa*, and *Bradypus* ; yet a very superficial observation will unfold characters generically distinct from either. It will be observed, that though this singular being is clothed with a coat (or rather cloak) of mail, in a slight degree resembling the armadillo, yet it differs remarkably in its texture, form, situation, arrangement, and mode of attachment to the body. In the armadillo, the body is covered with a hard, scaly shell, and consists,—1st. In a

plate upon the forehead. 2d. A vast shield, situate upon the shoulders, and formed of small rectangular compartments, disposed in transverse bands. 3d. In bands of similar plates, but moveable, and varying in number, from three to twelve more or less, according to the species. 4th. In a shield upon the rump, very similar to that on the shoulders. 5th. In rings more or less numerous on the tail; five toes behind; before sometimes five, at others four; hairs sparse. The whole shell is covered by a thin, transparent epidermis, which is joined to the skin of the belly, which gives to the shell a shining aspect, as if it were varnished; the extremities are entirely covered with strong scales. The armadillo burrows in the earth; is sufficiently quick in its motions; is capable of rolling its body into the form of a ball; and is omnivorous. The external ear is sometimes large, and always very apparent.

From this statement, we are convinced that there exists only the most distant analogy in the external covering of the *Dasytus* with that of the *new genus*; other analogies, which are found in the comparison of the skulls, will be referred to hereafter.

The lower portions of our animal, as well as that beneath the scales, will bear a pretty close comparison with the same parts of the mole, (*Talpa Europea*, (Lin.) white variety.) The hair is finer and longer than in the mole, and at a distance resembles long staple cotton in appearance. The eye is small; the neck, breast, and shoulders, are very powerful; the posterior extremities are short and weak; the anterior, short and strong, and furnished with large claws, as in the mole; but in the form of the head, in the structure and form of the claws, in the external ear, which is apparent when the hair is separated, our animal is totally dissimilar to the mole. The claws bear some analogy to the sloth, (*Bradypus*, Lin.) but are articulated to the last phalanx, as in the mole. Like the last named animal, the organs of generation must have open-

ed anterior to the pubis, and at a great distance from the sacrum, viz. before the inferior margin of the truncated portion of the shell, near the middle of the caudal vertebræ, which, as I have remarked above, are continued, within the truncated plate, to near the top of the back. Thus far, like the mole, our animal is eminently constructed for subterranean progression; and here, in all probability, any strict analogy with that animal ceases.

In the examination of the skull, we are struck with its many peculiarities, and great dissimilarity to that of the mole, to which it is so nearly allied in its subterranean habits. The skull of the latter animal is long and narrow, flattened vertically; the jaws are furnished with four large canine teeth, separated from each other; having between them six incisors above and eight below, seven molars on each side of the upper jaw, six on each side below, the crowns of which are furnished with sharp points; in all of which our animal differs entirely. Like the mole, the extremity of the snout is furnished with a sort of button, but of much firmer consistence; in the form of the snout, and posterior part of the skull, as well as in the effaced appearance of the sutures, some slight resemblance is visible. The palm of the hand is directed rather inwards, in our new genus; whereas in the mole it is directed outwards, and the nails are destitute of the cutting edge, so remarkable in the former. On comparing the skull of our animal with that of the armadillo, (*Dasypus sexcinctus*, Lin.) a few traits of similarity of typification are visible: both these animals being equally destitute of incisor and canine teeth in either jaw; in both, a considerable space intervenes between the anterior margin of the os intermaxillare and the commencement of the teeth; and in both the number of molar teeth is the same, viz. eight on each side of both jaws—thirty-two in all. Here all further analogy with the *Dasypus* is at an end.

In the last named animal, the crowns of the teeth terminate in two points, and, together with the bodies, are completely enveloped in enamel; they are so far separated from each other, that when the jaws are closed, those of the lower jaw pass between those of the upper; furthermore, the teeth are proportionally much shorter, neither sinking so deep into the jaw, nor rising so high above the alveoli. The whole form of the head, and of the jaws, particularly the inferior, will admit of no comparison in the two animals; lateral motion being almost entirely forbidden in the armadillo, and the greatest freedom in this respect existing in the *new genus*: in which, the *condyloid* extends above the *coronoid* process.

The teeth in structure are most nearly allied to those of the sloth, (*Bradypus tridactylus*, Lin.) that is to say, they consist of a simple cylinder of bone, surrounded with enamel, except the crowns, which are destitute of enamel in the centre; the roots, (or rather that portion buried in the jaw) of both these animals, are hollow. In these particulars, together with the short process descending from the zygomatic arch, which has been alluded to before, as well as in the form of the fore-claws, there is considerable analogy; but in all other points of organization, these two genera are most widely separated.

As far as the nature of the subject will admit, I have now gone through with the detail of the organization of this most singular quadruped. During the investigation, I have had frequent occasion to admire those laws of co-existence which regulate the structure of organized beings; Nature, true to herself in this as in all other instances, has pursued an undeviating course. We have been presented in the subject before us with a *new form*: an animal combining in its external configuration a mechanical arrangement of parts which characterises, respectively, the armadillo, the sloth, and the mole; constituting in themselves, individually and separately, of all other quadrupeds, those which offer the most remarkable anatomical characters. Pursuing the investigation step by step,

with the skeletons of the above-named animals before me, it was not until after I had completely finished every point of observation, that I perceived in the skull alone, of the new animal, a reunion, more or less complete, of all those remarkable traits that an external view of the animal had offered for contemplation; which, taken collectively, furnishes us with an example of *organic structure*, if not unparalleled, at least not surpassed in the history of animals.

The most peculiar and unique characters consist—First, In the general contour of the animal. Second,—In the form, texture, and disposition of its scaly cloak, which would very much confine the power of flexion and extension of the body, and nearly altogether impede lateral motion; the greatest freedom of motion would consist in the extension of the head on the body. Thirdly,—in the position of the organs of generation. Fourthly,—In the form, structure, position, and use of the tail. Fifthly,—In the peculiar and complicated structure of the feet and claws. Sixthly,—In the structure of the organ of hearing. Seventh,—In the bony protuberances on the os frontis. Eighth,—In the disposition of the teeth; and Ninth,—In the form of the lower jaw, which separates the animal, in this respect, from the order *Edentata*, and approximates it to the Ruminantia and Pachydermata.

Explanation of the Plates.

Plate XIX. Profile view of the Chlamyphorus, of the size of nature.

Plate XX. fig. 1. A view of the back of the head.
 fig. 2. Posterior truncated portion.
 fig. 3. Anterior view of the inferior portion of the body.
 fig. 4. Anterior and posterior view of the fore foot.
 fig. 5. Do. do. of the hind foot.

Plate XXI. fig. 1. Profile view of the cranium, magnified.
 fig. 2. Posterior view of the cranium, magnified.
 fig. 3. Anterior do. do. magnified.
 fig. 4. Several views of a tooth, magnified.
 fig. 5. Enlarged view of the organ of hearing, magnified.
 fig. 6. Anterior and inferior view of the end of the snout, magnified.

fig. 7. Relative position of the teeth.



REMARKS ON NATIVE SILVER from Michigan. By H. R. SCHOOLCRAFT. Read January 3, 1825.

Mineralogical and Chemical characters. By examining mineral, it will be perceived to possess the colour, lustre, malleability, and other obvious characters of native silver. It is so soft, as to be easily cut by the knife ; and in a state of ductility which permits it to spread under the hammer. These characters serve to distinguish it from antimonial silver, which is brittle ; from native antimony, which tarnishes on exposure, &c. The metal occurs in thin, massive veins in the

These veins sometimes intersect, but never cross each other. It is also disseminated in small particles through the rock, or spread in flattened masses over its surface. Some of these masses were detached by the discoverer, but have been rolled, and are presented to the Lyceum with the more perfect and undisturbed portions.

On submitting a small portion of the metal to the action of nitric acid, I obtained an imperfect solution. On repeating the experiment, and adding a little sulphuric acid, the action became more brisk, and a clear, and apparently perfect solution was effected. By standing, however, a pulpy, white precipitate appeared at the bottom of the glass. This was collected, and submitted to the action of the blowpipe, on a basis of charcoal.

The result gave a number of minute, metallic globules, possessing greater lustre, malleability, and ductility, than the original mass. I repeated the latter experiment, adding to the nitro-sulphuric solution muriate of soda. A more perfect precipitation of the white powder was effected ; but the results of the blowpipe remained the same.

Diagnostic position. It is a rolled mass. An opinion of the specific character of the rock, may be dubious, from the smallness of the specimen. It appears to have been detached from a stratum of gneiss, and is essentially composed of quartz.

The blackish colour of some parts of this latter mineral, would at a first glance, lead us to attribute this colour to the presence of hornblende; but on a closer examination, it will be perceived to be owing to a dark coloured steatite, which, in certain parts of the rock, is well developed, soft, and easily cut. A little calcspar is intermingled with the steatite.

Locality. I am indebted to the politeness of Lieut. Lewis S. Johnston, of the British Indian Department, at Malden, (U. C.) for the opportunity of adding this specimen to the mineralogical cabinet of the Lyceum. This gentleman, as he informed me, obtained it from the south-eastern shores of Lake Huron, near Point aux Barques, in Michigan Territory. That part of Lake Huron was cursorily examined by me, in the year 1820, in the course of the expedition conducted by Gov. Cass, through the upper lakes, &c. We considered it remarkable, even in a region abounding in rolled rocks, for the great number and variety of granite, gneiss, hornblende, and trap boulders, scattered along the shores of the lake. The water here is generally shallow, and dangerous to approach in vessels; these boulder stones sometimes extending and presenting themselves above water for a mile or more from land. But we could not satisfy ourselves, by an examination necessarily partial, that either of the primitive species mentioned, existed there in any other condition than as rolled masses, or displacements of rock strata, contiguous, perhaps, but not observed. Dr. Bigsby has informed me, that he observed the gneiss, in situ, on the north-western shores of this lake. The nearest rock in place, and that which in fact constitutes the abraded and caverned promontory of Point aux Barques, is gray sandstone.

SUPPLEMENT to a NOTICE of FOSSIL CRUSTACEA. By JER. VAN RENSSELAER, M. D. Read January 24, 1825.

IN a short notice which I had the honour to read to the Lyceum a few weeks ago, mention was made, in a note, of the discovery of a fossil crab in the possession of Major Delafield, that could not be found. I have now the satisfaction to mention, that it has been for more than eight months, in the Cabinet of the Lyceum.

It is the thumb of a large crab, much larger than any similar part of this animal that I remember to have seen fossil. Its shape is an incurvated cone, having on the inner margin a row of tubercles. This specimen differs from any that I have seen described, and was found in the vicinity of Yorktown, Virginia, imbedded in a conglomerate, similar to the matrix of the valuable fossil shells lately presented to our Cabinet. Among these we find many of the beautiful varieties characterising the tertiary formations of Europe.

DESCRIPTIONS of new American species of the Genera BUPRESTIS, TRACHYS, and ELATER. By THOMAS SAY.

Read January 17, 1825.

BUPRESTIS.

B. transversa. Cupreous or blackish; elytra with striae of punctures; a glabrous line between the eyes.

DESCRIPTION. *Body* varying in colour, from a dull cupreous to brownish black: *head* with large, confluent punctures, and a distinct elevated line extending transversely between the eyes: *eyes* distant: *thorax* with large confluent punctures.

tures, two elevated glabrous lines forming a groove between them; an elevated line on each side originating on the anterior edge, and becoming obsolete at the middle of its length; a somewhat elevated, oblique line at the posterior angles: *elytra* entire, rounded at tip, with regular striae of punctures: *beneath* much punctured.

Length half an inch.

It is about the size of *B. longipes*, Nob. The sexes, of a very dark colour, were sent me by Dr. J. F. Melsheimer, and I have a female, taken several years since, which is of a decided coppery tint, though somewhat dull; the colour, therefore, cannot be relied upon; but the lines of punctures on the *elytra*, the form of the thoracic lines, and the transverse frontal line, in conjunction with the entire *elytra*, are sufficiently characteristic.

2. *B. bilineata*. Thorax each side, and line on each *elytrum*, fulvous.

Buprestis bilineata, Melsh. Catal.

DESCRIPTION. *Body* slender; above, black: *head* dull brassy, longitudinally indented, and with an oblique indentation each side, on the front: *thorax* with a dull fulvous lateral margin: *elytra* rounded at tip, and minutely serrated; indented at base; on each is a slender, dull, fulvous line originating near the humerus, and extended towards the tip, where it gradually approaches the *scutel*: *scutel* transverse and transversely carinated: *beneath* dark green, polished on the venter; edge of the *postpectus* and *venter* with a dull fulvous line.

Length seven-twentieths of an inch.

The *quercata* Fabr. is described to be green, with a fuscous vitta on the *elytra*, and a spot on the thorax; it therefore differs

the present insect. The surface of the elytra appears d with minute imbricated points, which are more acute vious towards the tip.

arcuata. Dark bronze ; elytra black ; thorax with an ated line at the posterior angles.

DIPTION. *Body* slender : *head* punctured, with a longi-
nal indented line, and obsolete indentation each side on
front : *thorax* inequal, transversely confluent punct-
d ; an elevated, arcuated line, extends from the poste-
angle almost to the middle of the lateral margin :
el transverse and transversely carinated : *elytra* indent-
it base ; at tip rounded and denticulated : *beneath* dark
nish, polished, particularly on the venter.

h three-tenths of an inch.

a similar form to the preceding species ; but it is alto-
destitute of the marginal coloured line of the thorax,
lose of the elytra ; the elevated line of the thoracic an-
also distinguishes it. The imbrication of the elytra is
r to the preceding species.

polita. Cupreous, polished ; thorax with an elevated
: at the posterior angles.

DIPTION. *Body* slender, highly polished, cupreous :
d tinged with green, punctured ; longitudinal indented
: obsolete : *antennæ* blackish : *thorax* a little inequal ;
nsversely confluent punctured ; an elevated, arcuated
: extends from the posterior angle almost to the middle
the lateral margin : *scutel* transverse and transversely
inated : *elytra* indented at base ; at tip rounded and
nticulated.

th rather more than one-fifth of an inch.

Found by Mr. Thomas Nuttall on the bank of the Mississippi river. In many of its characters it resembles the *arcuata*, but is much smaller, and the colour is altogether different; the indentation of the head also is hardly perceptible. It is rather larger than *geminata* Nob. which, as I have ascertained, on close examination, has the elytra denticulated at tip.

5. *B. pusilla*. Blackish-green; front without any obvious impressed line.

DESCRIPTION. *Body* slender: *head* tinged with bluish, with obsolete, rather distant, punctures; excepting on the vertex, where they are rather large and confluent; *frontal* impressed line obsolete: *antennæ* black: *thorax* somewhat unequal; transversely confluent punctured; two slight, dilated indentations placed longitudinally on the disk, and a larger and more profound one on the lateral margin; an elevated, arcuated line extends from the posterior angle almost to the middle of the lateral margin: *elytra* indented at base, at tip rounded and minutely denticulated, the denticulations not extending on the sutural or lateral edge.

Length less than three-twentieths of an inch.

This is so much smaller than either of the above species, as to be distinguished readily by that character, without resorting to any other. I detected it at the cantonment of Major Long's party, on the Missouri.

TRACHYS.

1. *T. ovata*. Ovate, black; head without an indented line; elytra without regular punctures.

DESCRIPTION. *Body* very short, ovate, black: *head* without the usual dilated indentation, but a very slight indentation may be observed on close inspection, particularly on the

lower part of the front ; slightly punctured : *thorax* equal, with the exception of a dilated indentation on each side, with distant punctures in which is a raised centre : *scutel* large, flat, impunctured, polished : *elytra* with wide, irregular, not deeply impressed punctures, without any appearance of a regular series ; no appearance of elevated lines ; a profound excavation behind the humerus, without any sinus of the edge ; humerus prominent.

Length rather more than one-tenth of an inch.

This is the smallest species I have met with, and of a shorter form.

. *T. gracilis*. Oblong, blackish ; *elytra* with regular series of punctures.

DESCRIPTION. *Body* rather slender, oblong, blackish-brassy : *head* a little concave, but not profoundly so : *thorax* inequal, with a slight impressed line before, and a wide indented space occupying half the thorax behind ; on each side is a raised, arcuated, obtuse line, extending nearly from one angle to the other : *scutel* moderate : *elytra* with regular series of rather large, profoundly impressed punctures, which are obsolete at tip.

Length less than three-twentieths of an inch.

A comparatively slender species. I found it on a myrtle bush at Senipuxten island, in September. It exhibits an unusual regularity in its series of punctures.

ELATER.

1. *E. abruptus*. Black, covered with minute hairs ; junction of the thorax and *elytra* deeply excavated.

DESCRIPTION. *Body* black, polished, covered with minute punctures, which give rise to very short brown hairs, which

in a particular light have a somewhat sericeous appearance: serratures of the *antennæ* and *palpi* dull rufous: *thorax* considerably convex, at the base abruptly curved downwards, the lateral spines are, however, horizontal: *scutellum* convex, oval, making a considerable angle with the longitudinal diameter of the body: *elytra* with obsolete impunctured striæ, more distinct towards the margin and tip; base rather abruptly, very much decurved, so that, in conjunction with the form of the thoracic base, it exhibits a wide and deep excavation between the two parts of the body.

Length four-fifths of an inch.

Next in size to the *morio* and *lævigatus*, Fabr. of all the North American species I have yet seen. The latter species I believe to be only a variety of the former; it is equal in size, with the same form, impressed front, &c. the only difference is, that one has the *elytra* obviously striated, and the other has these striæ so far obsolete, that the *elytra* appear smooth to the eye.

2. *E. hemipodus*. Black; *thorax* convex, rather gibbous; *thighs* rufous.

Elater fuscipes, Melsh. Catal.

DESCRIPTION. *Body* black, with short hairs: *head* with an obsolete, impressed, arcuated line on the front: *antennæ* not serrated, black; basal joints dark piceous: *thorax* very convex, rather broadest in the middle, equally narrowed before and behind; lateral edge regularly arcuated, a little contracted near the posterior angles; no appearance of an impressed line; the interval between the *thorax* and *elytra* deeply indented: *scutellum* oval, truncated at base: *elytra* striated, minutely punctured, slightly tinged with brassy: *thighs* dark rufous.

Length eleven-twentieths of an inch.

This is a very different insect from the *fuscipes*, Fabr.

3. *E. unicolor*. Blackish-brown; antennæ simple; thorax short, narrowed before, and with an impressed line behind.

Elater unicolor, Melsh. Catal.

DESCRIPTION. *Body* blackish-brown, with short cinereous hair: *head* a little concave just above the interval between the antennæ and a longitudinal slightly impressed line: *antennæ* not serrated, third joint considerably longer than the fourth: *palpi* pale rufous: *thorax* somewhat convex, narrowed anteriorly by an arcuated line, at the posterior angles very slightly excurved; posterior declivity with an abbreviated impressed line, which does not reach the middle: *scutel* oval orbicular: *elytra* striate, striæ without very distinct punctures, but on each side of them a row of minute punctures may be traced on the interstitial lines which are a little rounded: *thighs* dull rufous.

Length rather more than half an inch.

4. *E. viridis*. Blackish-cupreous; venter in the middle, and feet rufous.

Elater viridis, Melsh. Catal.

DESCRIPTION. *Body* dark coppery, with short hairs: *head* with rather large, confluent punctures: *antennæ* rufous, robust, much serrated: *palpi* rufous: *thorax* distinctly punctured; a very obvious, obtusely indented line extends from the base to the anterior margin, where it is obsolete; posterior angles prominent, extending a little outwards: *scutel* orbicular: *elytra* striate, the striæ distinctly punctured: *epipleura* rufous: *feet* rufous: *venter* on the disk rufous.

Length rather less than three-fifths of an inch.

Very distinct, and readily recognised.

5. *E. parallelus*. Brown; thorax with the anterior angles dilated, and as wide as at the posterior angles.

Elater angulatus, Melsh. Catal.

DESCRIPTION. *Body* reddish-brown, minutely punctured: *antennæ* rufous, serrated: *thorax* longer than broad, rather widest at the anterior angles, which are much wider than the head; an impressed longitudinal line obsolete on the anterior margin; lateral edge subrectilinear: *scutel* orbicular: *elytra* with impressed, punctured striæ.

Length three-fifths of an inch.

The name *angulatus* is pre-occupied.

6. *E. muscidus*. Pale brown; thorax very short; antennæ rather robust, simple.

Elater muscidus, Melsh. Catal.

DESCRIPTION. *Body* pale brown, a little tinged with reddish, somewhat densely covered with cinereous, short hair: *head* transverse line between the antennæ, not elevated in its middle: *antennæ* very hairy, robust, and rather long, without any appearance of serrature: *mouth* ciliated above: *thorax* very short, a little transverse, and convex, narrowed before to the width of the head, somewhat widest in the middle, a little contracted before the posterior spines, which are not elongated; a longitudinal slightly impressed line from the base to the middle: *scutel* orbicular: *elytra* with impunctured striæ.

Length more than three-fifths of an inch.

This species is more thickly covered with hair than usual. I am unacquainted with the *griseus*, Beauv. : but if his figure is even a tolerable representation, our insect is very distinct, his description is too short and unessential to give any assistance.

7. *E. attenuatus*. Reddish ; elytra lanceolate, black at tip.

Elater attenuatus, Melsh. Catal.

DESCRIPTION. *Body* brownish, sanguineous, with short hairs : *head* blackish, without any transverse elevated line : *antennæ* deeply serrated, blackish rufous ; third joint very short, not longer than the second ; *thorax* with an impressed abbreviated longitudinal line on the posterior margin ; anterior margin not wider than the head ; posterior spines rather long and acute : *scutel* oval : *elytra* with the striæ obsolete, gradually attenuated to the tip, which is lanceolate, acute ; region of the scutel deeply indented ; tip black, occupying nearly one-third of the surface, and terminating anteriorly obliquely.

Length nearly four-fifths of an inch.

This species seems to be rare.

8. *E. viridipilis*. Depressed, black, covered with short blackish-green hair.

DESCRIPTION. *Body* dilated, somewhat depressed, black, with a greenish tinge occasioned by short hair of that colour : *head* concave, the transverse line between the antennæ obtuse : *antennæ* deeply serrated ; third joint very short, equal to the second : *thorax* depressed, longer than broad ; sides rectilinear and parallel ; anterior angles acute, wider than the head ; posterior angles not spiniform : *scutel* subtriangular : *elytra* with impressed, punctured

Length three-quarters of an inch.

The thorax is more than half the length of the elytra.
Rare.

9. *E. inflatus*. Dark cupreous, short, robust; feet rufous.

Elater metallicus, Melsh. Catal.

DESCRIPTION. *Body* short, very robust, dark cupreous, with short cinereous hair: *head* with the transverse line between the antennæ obtuse, not prominent: *antennæ* dark piceous, a little serrate, *radix* rufous: *thorax* elevated convex, breadth equal to the length; a longitudinal impressed line obsolete on the anterior margin; posterior spines moderate: *scutel* orbicular: *elytra* with impressed striæ, which have small punctures: *postpectus* blackish: *feet* pale rufous.

Length nine-twentieths of an inch.

Unusually short and thick. It is very different from *obesus*, nob. by its much more robust form, by having an impressed thoracic line, and by its general colour.

10. *E. erosus*. Brownish-rufous; thorax with five indentations.

DESCRIPTION. *Body* entirely rufous, tinged with brownish, slightly hairy: *head* with an impressed longitudinal line: *antennæ* not serrate, the joints short, terminal joint produced at tip and acute: *thorax* short, decidedly broader than long, lateral edge much arcuated, posterior angles short; base with an impressed line extending to the middle with an abbreviated impressed line on each side of it, not reaching the base, on each side of the middle is a slight indentation: *scutel* small, orbicular, convex: *elytra* rather deeply striated, striae with small punctures: *beneath* a little paler.

Length two-fifths of an inch.

Differs from *lacunosus*, Fab. in magnitude and colour, as well as in the disposition of the thoracic indentations, which in that species are placed 2. 1. 2., whereas in the present species they are 2. 3. I obtained it near the Rocky Mountains, whilst exploring that country with Major Long's party.

- 11 *E. viridanus*. Dull reddish brown; thorax with two indentations.

Elater viridanus, Melsh. Catal.

DESCRIPTION. *Head* with an obsolete indentation on the vertex: *antennæ* serrate, second joint thicker but shorter than the third: *thorax* longer than broad, slightly and gradually narrowed before; two very distinct deeply indented punctures before the middle each side; a longitudinal slightly indented line extends from the base to the middle; posterior angles prominent, acute, *scutel* oval: *elytra* with punctured, impressed striæ: *beneath* paler rufous.

Length seven-twentieths of an inch.

The anterior indentations of the thorax are situated much farther forward than those of the *erosus*, nob.

12. *E. rotundicollis*. Thorax rufous, sub-quadrate, rounded.

Elater ruficollis, Melsh. Catal.

DESCRIPTION. *Head* blackish piceous, irregularly punctured, transverse frontal line obtuse: *thorax* rufous, convex, quadrate; anterior and posterior diameters equal, and equal to the longitudinal diameter; anterior angles obtusely rounded, much wider than the head; edge a little contracted before the posterior angles, which are a little

excurved and very acute : *scutel* blackish piceous, subtriangular : *elytra* dusky brownish, with acute hardly punctured striae and convex interstitial lines : *beneath* rufopiceous : *tarsi* pale.

Length rather more than seven-twentieths of an inch.

The thorax has a remarkably rounded appearance to the unassisted eye. It is different from the *ruficollis* Fabr.

13. *E. impressicollis*. Dull rufous ; thorax with an impressed line and two indentations.

Elater fuscus, Melsh. Catal.

DESCRIPTION. *Body* rather slender, dull rufous, punctured, with short curved hairs : *head* with a prominent, subacute, transverse, frontal line : *antennae* deeply serrated, the serratures paler : *thorax* longitudinal, rather slender, gradually a little narrowed before ; anterior angles not broader than the head ; edge contracted before the posterior angles which are oblique and not much elongated ; a longitudinal impressed line obsolete on the anterior margin, and two rounded indentations on the posterior submargin : *scutel* oblong : *elytra* with regular close set series of rather large profound punctures.

Length more than seven-twentieths of an inch.

Readily recognisable by the two indentations of the thorax. The name *fuscus* is pre-occupied.

14. *E. silaceus*. Slender, pale ochreous ; head and thorax tinged with the rufous.

Elater silaceus,
Elater umbraticus, } Melsh. Catal.

DESCRIPTION. *Body* pale yellowish ochreous, with short hairs; slender: *head* without any prominent transverse line: *antennæ* not serrated, second and third joints equal and shorter than the succeeding ones, terminal joint not truncated, nor very acute: *thorax* slightly tinged with rufous; longer than broad; not decidedly narrowed before; anterior angles not broader than the head; posterior angles a little excurved, rather long; a longitudinal obsolete, impressed line: *scutel* oblong, convex: *elytra* with punctured striæ not very deeply impressed: *venter* yellow.

Length nearly three-twentieths of an inch.

A very common species. I have a variety of which the thorax and venter are almost black.

15. *E. rubricus*. Thorax bright rufous with a large black spot; elytra paler.

Elater rubricus, Melsh. Catal.

DESCRIPTION. *Body* oblong oval: *head* black, transverse line acute, but not very prominent: *antennæ* piceous, robust, deeply serrated, second and third joints equal, much smaller than the following ones, which are triangular, excepting the terminal ones; ultimate joint slightly truncated at tip: *thorax* as broad as long, regularly arcuated, and with the head forming a semi-oval; highly polished, bright rufous with a very large black orbicular spot before, reaching beyond the middle: *scutel* oval, truncate at base: *elytra* pale brownish-rufous, with regularly punctured, impressed striæ: *postpectus* and middle of the *pectus*, black: *feet* piceous.

Length nearly three-tenths of an inch.

2. *dilectus*. Brownish black; thorax rufous, bilineate black.

Elater trilineatus, Melsh. Catal.

DESCRIPTION. *Body* short, robust : *head* piceous-black, transverse line prominent, regularly rounded, acute : *antennæ* hardly serrated, piceous, second and third joints sub-equal, the second joint rather longer : *thorax* large, convex, rufous, with two longitudinal, dilated blackish lines, which do not reach the base ; posterior angles prominent, acute : *scutel* suborbicular : *elytra* brownish-black, with regularly punctured, impressed striæ : *venter* piceous at tip : *feet* pale.

Length rather more than a quarter of an inch.

Var. a. A rufous dilated vitta extends from the humerus towards the tip of the elytra.

Var. b. Vitta on the elytra, and beneath rufous ; feet white.

Var. c. Thoracic vitta confluent and reaching the base.

The specific name *trilineatus* is pre-occupied.

17. *E. quercinus*. Black ; front concave ; feet pale.

Elater quercinus, Melsh. Catal.

DESCRIPTION. *Body* slender, black, with rather long hairs : *head* with the transverse line much elevated and emarginate in the middle : *antennæ* rather robust, serrated, three basal joints rufous, second and third joints nearly equal : *thorax* longer than broad, hardly narrowed before ; a very slightly impressed longitudinal line ; anterior angles not wider than the head ; posterior angles depressed, obtuse, piceous : *scutel* orbicular : *elytra* with slightly impressed, deeply punctured striæ : *feet* pale yellowish, tinged with rufous.

Length one-fifth of an inch.

A common species.

18. *E. plebejus*. Black; front concave; feet pale; elytra dark brown.

Elater plebejus, Melsh. Catal.

DESCRIPTION. *Body* rather slender, black, with rather short hair: *head* with the transverse line much elevated and emarginate in the middle: *antennæ* hardly serrated, dark brown, three basal joints dull rufous, second and third subequal hardly shorter, but more slender than the succeeding ones: *thorax* convex, widest in the middle; anterior angles not wider than the head; an obsolete obtuse indented line, obvious at base; posterior angles rather obtuse, piceous; anterior and lateral margins obscure piceous: *scutel* oval, truncated: *elytra* dark brown, obscure piceous at base; *striæ* slightly impressed, acute, punctured: *beneath* piceous: *pospectus* and middle of the *pectus* blackish: *feet* pale.

Length seven-twentieths of an inch.

This species is very similar to the preceding, but its greatly superior magnitude puts their specific difference beyond a doubt.

19. *E. rectangularis*. Fuscous; robust; posterior angles of the thorax rectangular.

DESCRIPTION. *Body* robust, very dark brown, almost blackish, with numerous, short, very robust whitish bristles: *head* with the hairs incurved; transverse line acute: *antennæ* not reaching more than half the length of the thorax, serrated, pale rufous, first joint fuscous, second and third joints subequal, terminal joint oval: *palpi* pale rufous: *thorax* subquadrate, rapidly narrowing before the middle; posterior angles not produced, but rectangular: *elytra* with regular series of large profound punctures: *feet* dull rufous.

Length two-fifths of an inch.

This remarkable species I found near the Rocky Mountains during the journey of Major Long's exploring party. It differs widely from any other species I have seen, by its general aspect, as well as by its short antennæ, (which were completely concealed in the lateral fissures of the pectus,) and the rectangular posterior thoracic angles.

20. *E. cucullatus*. Thorax rather long; frontal line remarkably elevated, and concave above.

DESCRIPTION. *Body* reddish-brown, with very short hairs: *head* with the frontal transverse line very much elevated and prominent, lanciform, obtusely rounded and concave on its superior surface: *antennæ* rather long, slender, not serrated, second joint much shorter than the third: *thorax* longer than broad, rather slender, with a longitudinal impressed line; a little narrowed behind the anterior angles, and before the posterior ones, the latter not very prominent, obtuse: *elytra* indented at the base of each, with impressed punctured striæ, the punctures of the interstitial lines rather large.

Length nine-twentieths of an inch.

The peculiar form of the transverse line of the front, renders this species easy of recognition. I found it on an oak tree in June. In form it has considerable resemblance to *E. pyrrhos*, Herbst, but is very different, by many other characters.

21. *E. geminatus*. Black; elytra with an oval rufous spot before the middle of each.

Elater bimaculatus, Melsh. Catal.

DESCRIPTION. *Body* deep black, polished, with numerous hairs; oblong-oval: *head* with the transverse line acute, but not prominent: *antennæ*, basal joints pale rufous: *thorax* widest at base, gradually narrowed by an arcuated line to the anterior angles which are not wider than the head; no impressed line; posterior angles not prominent: *elytra* with irregular punctures, destitute of impressed striæ; a large, oblique, oval, bright rufous spot a little before the middle of each, hardly reaching the suture or the exterior edge: *feet* piceous.

Length less than three-twentieths of an inch.

This pretty little species seems to be allied to the *bimaculatus* of Europe, but the elytra are not striated, as those of that species are.

22. *E. nimbatus*. Pale brownish ochreous; elytra striate; venter dusky.

Elater nimbatus, Melsh. Catal.

DESCRIPTION. *Body* rather slender, of a pale colour, with somewhat long hairs: *head* with the transverse line elevated, acute: *antennæ* somewhat slender, not serrated; second and third joints short, equal: *thorax* tinged with dull rufous, not longer than broad, with an impressed longitudinal line; posterior angles acute, a little excurved at tip: *scutel* orbicular: *elytra* paler than the thorax, without any rufous tinge; with impressed punctured striæ: *beneath* pale rufous: *venter* dusky.

Length more than three-twentieths of an inch.

23. *E. brevicornis*. *Antennæ* very short; thorax blackish, anterior and posterior margins piceous.

DESCRIPTION. *Head* hairy: vertex obtusely indented; transverse line of the front slightly elevated: *antennæ* not reaching beyond two-thirds the length of the thorax; piceous; joint subcordate, serrated second joint much shorter than the third: *thorax* rather convex, blackish, slightly tinged with very dark purple-coppery, anterior and posterior margins obsolete piceous; lateral edges parallel, curving inwards before the middle; posterior angles excurved; a longitudinal, obtuse, slightly impressed line obsolete before the middle: *scutel* ovate orbicular, hairy: *elytra* dark brownish, very slightly metallic, lateral margin and suture paler; with impressed, punctured *striae*: *beneath* blackish: *feet* dull rufous: *pectus* dull rufous on the anterior margin: *venter* with the margin, and edges of the segments dull rufous.

Length three-fifths of an inch.

The antennæ are shorter than those of any other species I have seen, with the exception of the *rectangularis* nob., for which, however, it cannot be mistaken.

24. *E. clypeatus*. Black; antennæ and feet rufous; clypeus extending down to the mouth.

DESCRIPTION. *Body* slender, deep black, punctured: *head* with a shallow rounded indentation on the front: *clypeus* narrowed between the antennæ, thence dilated and extending down to the mouth: *antennæ* serrate, bright rufous, joints short, second about one-third as long as the third joint: *thorax* widest at the base, posterior angles excurved, and towards their tips incurved: *scutel* rather large: *elytra* with impressed, punctured *striae*; second, third, and fourth *striae* confluent behind the middle: *feet* dull rufous.

Length less than one-fifth of an inch.

This may be mistaken for the *quercinus* nob. ; but an inspection of the form of the head and its parts will show that it is very distinct. The form of the clypeus is somewhat unusual ; instead of terminating in an elevated line between the antennæ, or but little before them, it is very much narrowed in that part, and as it descends towards the mouth, it dilates very much.

25. *E. insipiens*. Bright reddish-brown ; transverse frontal line much elevated, rounded.

DESCRIPTION. *Body* rather slender, bright reddish-brown, polished : *head* with the transverse line prominent, regularly rounded, the edge acute : *antennæ* a little serrate, second and third joints subequal : *thorax* with an obsolete impressed line at base : *elytra* with impressed punctured striæ.

Length more than one-fifth of an inch.

26. *E. appressifrons*. Obsoletely metallic ; transverse frontal line not prominent.

DESCRIPTION. *Body* rather slender, dark brownish, with a slight brassy tinge ; hairs recurved, not prominent : *head* with the frontal line or tip of the clypeus not elevated, but decurved between the antennæ : *antennæ* rather robust, serrate ; second joint much shorter than the third, which is of the same form, and nearly of the same size as the fourth ; terminal joint abruptly contracted near the tip : *thorax* with an impressed longitudinal line obsolete before : *elytra* with acute, punctured striæ, suture exterior margin somewhat paler : *feet* piceous : *abdomen* margined with dull rufous.

Length two-fifths of an inch.

Rather common. It closely resembles *cylindriciformis* nob. : but that insect is somewhat larger, with a prominent, emar-

ginated frontal line, the third joint of the antennæ is cylindrical, altogether different in form from the fourth, and the ultimate joint is not abruptly contracted near the tip; in these and many other characters it obviously differs from the present species. In some specimens the anterior margin of the thorax is obscurely piceous.

27. *E. collaris*. Black; thorax rufous; frontal line not reflected; second and third joints of the antennæ subequal.

Elater collaris, Melsh. Catal.

DESCRIPTION. *Head* black, the frontal transverse line or tip of the clypeus not in the slightest degree reflected, but considerably elevated above the surface of the nasus: antennæ serrate, second and third joints subequal and nearly alike in form; *thorax* bright rufous, posterior spines acute: *scutel* black, orbicular: *clytra* black, with impressed, punctured striæ: *pectus* each side bright rufous.

Length rather less than seven-twentieths of an inch.

Herbst considers this as a variety of the *thoracicus* Fabr., to which indeed it is very similar, but that species differs in having the tip of the clypeus, or the transverse frontal line, reflected, and the third joint of the antennæ much longer and more dilated than the second. Our species is also very similar to the *verticinus*, Beauvois, but the latter is greatly larger, the head is either partially or entirely rufous, and the third joint of the antennæ is much longer than the second; it has been called *rubricollis* by Herbst, but Beauvois' name has the priority.

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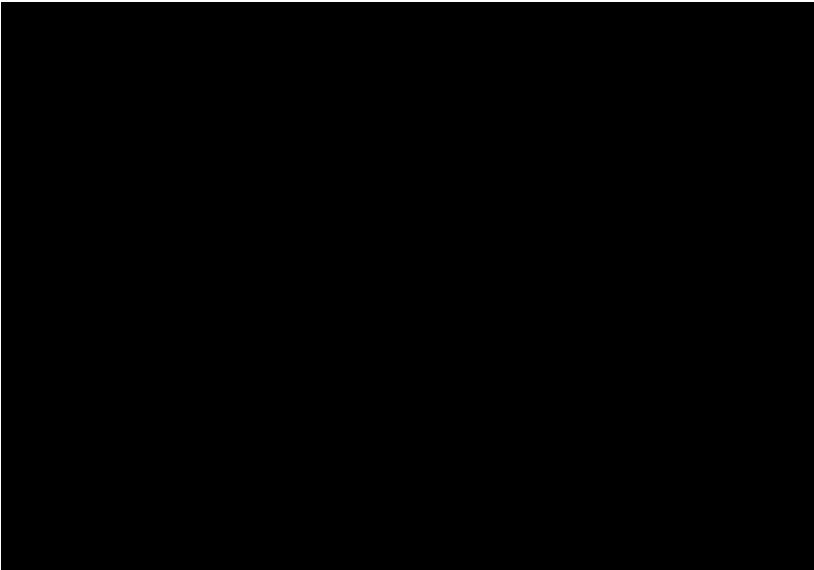
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Further Observations on the AMPHIUMA MEANS. By RICHARD HANLAN, M. D. Read December 6, 1824.

In the third volume of the journal of the Academy of Natural Sciences of Philadelphia, I published an account of this animal. Since that period, I have examined three other individuals, and have thus been enabled to correct some misstatements in that paper.

It was stated that in the *Amphiuma* "there are no ribs, only motionless rudiments, resembling in this respect the *Proteus anguinus*." There are in fact no ribs in this animal, but in this it does not resemble the *Proteus*, which is furnished with moveable rudiments, as in the *siren*. This is an error into which I was led by comparing it with the engravings of the skeleton of the *Proteus* which accompanies Cuvier's Essay on the doubtful reptiles, (in Humboldt's Voyage, part II. livraison 3,) where the ribs are thus represented. It was also omitted to be mentioned that the anterior and posterior surfaces of the vertebræ are deeply concave, as in fishes. Externally there is no appearance of tympanum. Found in ponds and ditches about New-Orleans, in Florida, Georgia, and South Carolina. They are capable of living on dry land, but how long, has not been accurately ascertained. The individual in the possession of Dr. Mease, died from the vessel in which it was confined, and when a few days after, was brisk and lively; and I am informed by Major Ware, that they are sometimes discovered at three feet under mud, of the consistence of mortar, in which they burrow like worms, as was instanced in digging a street in Pensacola, when great numbers were thrown up in the winter season. It is called in Florida, "Congo" by the negroes, who believe them poisonous, but without foundation.

I have lately received through the politeness of Mr. N. A. Ware, which were sent to him from Florida by Mr. La Rue (of Pensacola.) The smallest was very interesting, as it was but three inches in length, and yet did not exhibit the least appearance of branchiæ. Total length of the largest was two feet two inches; breadth of the head across the eyes eleven-tenths of an inch: distance between the eyes seven-tenths; between the nostrils three-tenths; from the eyes to the tip of the snout seven-tenths; distance between the anterior and posterior extremities twelve inches and three-tenths. Vent, a distinct longitudinal rima situated immediately behind the posterior extremities. From the vent to the extremity of the tail six inches and three-tenths; tail tapering and compressed at the lower half. Girth four inches two-tenths; length of the posterior extremity six-tenths: of the anterior four-tenths, perhaps somewhat contracted by spirits.

I am indebted for the accompanying drawing, Plate XXII. to Mr. Titian Peale.

NOTE to a paper entitled OBSERVATIONS on the GENUS
SALAMANDRA at p. 222 of this volume.

In the October number of the "Bulletin des Sciences Naturelles," for 1824, Dr. J. C. Van Hasselt has proposed the name of *Abranchus* for a genus of mollusca inhabiting the Island of Java. As this name has the priority over mine, I have determined to propose the following in its stead.

GENUS MENOPOMA.

GENERIC CHARACTER. *Persistent operculi*; destitute of branchiæ at all times, these organs being replaced by operculi; five toes to the posterior, four to the anterior extremities; the outer edge of the feet fimbriated; two outer toes of the hind feet palmated; clawless.

LENOPOMA Alleghaniensis, (nobis.)

Ubranchus Alleghaniensis, Ejusdem, Annals of the Lyceum of Nat. Hist. N. Y. p. 233.

Salamandra Alleghaniensis, Michaux.

Sal. Gigantea, Barton.

Algo. *Hell-bender*. *Ground-puppy*. *Tweeg*. *Mud-devil*,

NTIAL CHARACTER. *Head* broad : nasal openings protruding : *mouth* wide ; a dark lateral line passing through : *eyes* : *body* slate colour, mottled above with dark spots : *tail* compressed.

T. Carnivorous : exceedingly voracious : living in the water : feeding on worms, fish, crabs, &c.
inhabits the Alleghany and Ohio rivers.

DESCRIPTIONS of some new PLANTS belonging to the Orders MUSCI and HEPATICÆ. By ROBERT KAYE GREVILLE, A. D. F. R. S. E., Hon. Member of the Lyceum of Nat. Hist., &c. Read May 30th, 1825.

MUSCI.

CALYMPERES.

CALYMPERES Hobsoni ; caule elongato (unciali ;) foliis linearibus, serratis, acutiusculis, linea incrassata infra marginem notatis, subpatentibus, siccitate crispatis ; calyptra vi ; theca ovato-oblonga. TAB. XXIII.

In Guyana lectum, communicavit D. Hobson.
fibrous. Stems (tufted ?) about an inch in length, erect, decumbent at the base, simple or very slightly branched. Leaves bright green, long, linear, somewhat attenuated to-

wards the apex, subacute, serrated, almost spreading when moist, somewhat carinate, twisted when dry, the margin furnished with an incrassated line of a darker colour than the rest of the leaf, at a short distance from the serratures. Nerve percurrent. The structure of the leaf is dense, except at the base, which embraces the stem with its dilated portion, and is reticulated and of a paler colour. *Seta* terminal, about one-quarter of an inch long. *Capsule* erect, ovate-oblong, shining bright yellowish brown, or reddish. *Lid* nearly as long as the capsule, straight, exactly subulate. *Calyptra* smooth, not twisted, pale, with a brown apex, entire enveloping the capsule, at length splitting on one side, and becoming dimidiate. *Peristome* a spongy white membrane, nearly closing the mouth of the capsule, without any trace of teeth in any specimens.

The genus *Calymperes* was originally defined by the orifice of the capsule being closed by a spongy membrane; and two species were described by my friend, Professor Schwaegrichen. A third species was added by Dr. Hooker, in his *Musci Exotici*, but as some difference of structure was evident in this plant, which he named *C. Gardneri*, he found it necessary to modify the generic character, in order to receive it, and his definition in the above-mentioned inimitable work stands thus: "*Seta terminalis. Peristomium simplex, e membrana spongiosa horizontali totum os tegente demum medio in dentibus 16 brevibus fissa. Calyptra magna, mitriformis, capsulam involvens, demum lateraliter fissa.*" To the correctness of this character, as affecting *C. Gardneri*, I cannot refrain from adding my own testimony, as I examined the plant along with my excellent and acute friend, whose figure and description are in every respect faithful. Schwaegrichen, however, not acquiescing in this arrangement, has proposed a new genus in the second part of the second supplement to Hedwig's species *Muscorum*: this new genus he has named *Syrrophodon*, and founded upon no fewer

six species. His character rests mainly upon a short peristome of 16 nearly horizontal connivent teeth, "tus adnatis," and a smooth calyptra. The true *Calymperes* has, according to him, a furrowed calyptra. It is very doubtful in my opinion, whether *Calymperes* and *Syrrhopodon* can not be found to pass so much into each other, as to render it impossible to keep them distinct. The peristome of *Calymperes Gardneri* (Hook.) is exactly intermediate, consisting of a spongy membrane at the base, while the centre splits into short teeth. In *Calymperes Hobsoni*, of the present paper, the calyptra is smooth, and consequently we could expect from Schwaegrichen's observations, that the capsule would be furnished with a peristome. There is, however, nothing to be seen but a very white spongy membrane, and such a cavity in the centre, as we might suppose to be produced by the destruction of such short teeth as *C. Gardneri* possesses. In some species of *Syrrhopodon*, the teeth are figured as distinct, to the base, while in others, (*S. Taylora*, *involutus*,) they are united towards the base.

CALYMPERES Hobsoni, bears a considerable resemblance to *Syrrhopodon albobaginatulus*, but the calyptra is much larger, the leaves more rigid, not so exactly linear, and differing in the kind of margination. The spongy membrane shrinks much in drying, so that it resembles only a white ring in the mouth of the capsule, but swells out instantaneously on the application of moisture.

B. XXIII. Fig. 1. Plants nat. size. 2. A leaf magn. 3. A small portion of the margin of a leaf. 4. Calyptra. 5. Capsule with the operculum. 6. Appearance of the peristome in every specimen I examined. All except fig. 1. more or less magnified.

BRYUM.

BRYUM ciliare; caule elongato, foliis oblongo-obovatis, cutiusculis, minute reticulatis, marginatis, serrato-ciliatis.

serraturis articulatis, nervo excurrente; theca oblonga pendula, pallida, operculo pallido, conico-hemisphærico apice minute mammoso rubro. TAB. XXIII.

HAB. In Canada, circa Montreal, lectum, communicavit amiciss. A. F. Holmes, M. D.

Root tomentose. *Stem* 1-2 inches in height, erect, or frequently decumbent for the greater part of its length, simple, occasionally slightly branched by innovation, covered with reddish down. *Leaves* mostly expanding at the summit of the stem, as in *B. rostratum*, but there are also a few of a smaller size scattered remotely on the stem. In form they are oblong-obovate, attenuated considerably at the base previous to insertion, more or less acute, sometimes even obtuse, undulated, marginated, furnished with serratures, or rather ciliæ, which are spreading, cylindrical, and articulated; nerve shortly excurrent, and so strong as to give the leaves an arched form when dry. *Seta* near two inches long, pale yellow above, shining, deep red-brown below. *Capsule* oblong, ventricose, pendulous, pale yellowish, sometimes reddish at the base, the orifice surrounded by a cartilaginous orange line. *Lid* between conical and hemispherical, pale yellow, or tinged with orange, the apex minutely mammosa and fine red. *Peristome*; *outer one* composed of yellow teeth subulate at their apex; *inner one* of 32 segments rounded towards the points, and becoming abruptly subulate, with alternating ciliæ.

This fine new species of *Bryum*, which I have lately received from my friend and correspondent Dr. Holmes, of Montreal, is nearly allied to *B. cuspidatum*, and *Mnium affine*, of Blandon. To the latter moss it approaches so near in some points, that I at first regarded them as identical. They do, however, differ in several remarkable features, and upon consulting the specimen published as *B. affine* by Funck, in his beautiful "Deutschlands Moose," I became

sensible that our Canadian plant is really distinct. The leaves are much longer in proportion to their breadth, and their margins so much more decidedly serrato-ciliate, that this character is visible even to the naked eye. The fruit-stalk is almost invariably solitary; whereas in *B. affine* there are usually five. The capsule is larger and more oblong. Both species are remarkable for their tomentose stems.

TAB. XXIII. Fig. 1. Plant nat. size. 2. Leaf magn. 3. Portion of do. 4. Capsule with the operculum. 5. Part of the outer peristome. 6. Part of the inner do. All except fig. 1. more or less magnified.

HYPNUM.

3. *HYPNUM Haldanianum*; caule elongato, repente, vage ramoso, ramis subpinnatis; foliis imbricatis, lutescentibus, ovato-lanceolatis, integerrimis, enervibus vel obscure basi binervibus; theca cylindrica, arcuata, erecto-cernua, operculo conico, oblique rostrato, arcte adhærenti. **TAB. XXIII.**

HAB. In Canada, apud *Moose Factory* lectum, benevole communicavit D. Haldane.

Stems creeping, tomentose on the under side, here and there with little tufts of radical fibres, 2-9 inches in length; irregularly divided, the branches unequally pinnate with ramuli of half an inch, or one inch long. *Leaves*: *Cauline ones* imbricated, bright yellowish green, shining, nearly erect, ovate-lanceolate, quite entire, somewhat concave, nerveless, or with two short extremely faint nerves at the base: *Perichætal ones* much attenuated, diverging or somewhat spreading at their upper portion. *Fruit-stalk* an inch or an inch and a half in length, red, slender, smooth. *Capsule* long, cylindrical, arched, erecto-cernuous, pale buffish red. *Lid* conical, with a very sharp acute beak as long as the conical portion, of the same

colour as the capsule, adhering to the mouth of the capsule with such singular tenacity, that out of many mature ones, I have never seen it wanting, and it is separated with difficulty by artificial means.

I have every reason to conjecture that this very handsome *Hypnum* must be of frequent occurrence in Canada, and very probably throughout the northern division of the United States; it was collected by my friend, John Haldane, Esq., in two localities, and, judging from the luxuriance of the large masses he kindly preserved for me, it must exist in great abundance. In both instances it appears to have grown upon the trunks of (probably fallen) trees; and in the centre of the masses to have in part lost the creeping character, from the stems and branches having been much crowded and drawn up.

I am not aware of any species with which *H. Haldanianum* can be confounded.

TAB. XXIII. Fig. 1. Plant nat. size. 2. Leaves. 3. Perichæcium. 4. Capsule with the operculum. 5. Two of the teeth of the outer peristome. 6. Part of the inner do. All except fig. 1. more or less magnified.

HEPATICÆ.

JUNGERMANNIA.

4. *JUNGERMANNIA carinata*; exstipulata; caule prostrato, (semiunciali) simplici; foliis patentibus, distichis, ovatis, acutis, profunde concavis dimidiato naviculæformibus dorso processu foliaceo versus apicem præcipue carinatis.

TAB. XXIII.

HAB. In Insula Guadaloupe lecta, I. Ricord Madianæ, M.D. Benevole misit Cl. Torrey.

Plant of a dull fulvous yellow colour. *Stem* prostrate, half an inch in length or more, simple, entangled among other mosses. *Leaves* small, distant at the base, becoming

gradually larger and closer towards the summit; distichous, spreading, of an ovate outline, entire, acute, the apex somewhat incurved; the body of the leaf may be either considered as formed of two equal lobes, or as a single leaf deeply concave, and carinate in a remarkable manner at the back, with a foliaceous process, especially towards the apex, and disappearing towards the base. It appears to me more natural to view the leaf in this light, and it may be said to bear a striking resemblance to a boat divided transversely in the middle. *Fructification* unknown.

The varieties of form in the leaves of the *Jungermannia* seem to be really endless. The leaf of the present individual resembles that of no other species I am acquainted with; but *J. Thouarsii*, of Hooker, forms the nearest approach towards it, though widely different in every other respect.

TAB. XXIII. Fig. 1. Plant nat. size. 2. A small portion magn. 3. Leaves. 4. Segment of a leaf in the dry state. All except fig. 1. more or less magnified.

5. *JUNGERMANNIA tenax*; exstipulata; cæspitosa; caule erecto, (vix unciali) coriaceo, basi nudo, bipinnato, apice curvato, ramis ramulisque brevibus, obtusis, secundis incurvatis; foliis minutissimis, undique imbricata, erectis, brevibus, multipartitis, areolis minutis, segmentis setaceis. **TAB. XXIII.**

HAB. In Nova Hollandia lecta, communicavit, D. Fraser. *Plant* densely tufted, scarcely an inch high, of a dull green colour. *Stems* erect, very pale, thick for the size of the plant, remarkably tough, naked for one-half of its length, set towards the summit with a few branches in an alternately pinnate manner, the lower ones about two-eighths of an inch in length, and bearing at most three or four minute ramuli. The whole of the upper half of the stem is much

curved, and towards the apex even rolled in, while the branches and ramuli are all directed to one side, and incurved in the same manner. *Leaves* imbricated on all sides, remote below, more numerous above, short, erect, divided into 5-8 setaceous, articulated segments, the central ones of which are three or four times as long as the body of the leaf; the lateral segments are much shorter. The *reticulation* of the body of the leaf minute; that of the segments large. Towards their apex the segments appear to be cylindrical, are simply articulated, and in the dry state, have the joints often collapsed in alternate directions, as in many *conserveæ*. *Fructification* unknown.

This most singular species I extricated from some other mosses communicated to Dr. Hooker and myself, by our excellent correspondent, Mr. Charles Fraser. The stems are flexible and exceedingly coriaceous, and the ends of the branches and ramuli, rigidly incurved.

TAB. XXIII. Fig. 1. Plant nat. size. 2. A portion magn. 3. Leaves. 2 and 3 magnified.

REMARKS on the *American species of the GENERA Hyla and Rana*. By Captain JOHN LE CONTE of the United States army. Read 16th May, 1825.

DAUDIN in his excellent history of the genera *Hyla*, *Rana*, and *Bufo*, has enumerated six species of the first genus, as inhabiting North America. Two of these, *H. venulosa*, and *H. palmata*, have certainly never been found in our country, and are probably natives of South America. The *H. ocularis* I consider a variety of *H. squirella*; there will then remain only three that were known to European naturalists, and to

these I shall add two new species. Before proceeding to the description of them, it will be well to make some remarks upon those already known; as the descriptions are in some degree faulty, not having been made from living specimens. I shall adhere to the same order that M. Daudin has observed.

1. *Hyla lateralis*. The description of this animal should be corrected, by saying, that the lateral line, from which its name is derived, is most commonly silvery, in some few instances yellow. Inhabits in great numbers in Carolina and Georgia, particularly on water plants, such as the *Pontederia cordata*, the *Nymphæa*, and others, that generally grow in ditches, and on the margin of rice fields. They are very noisy, particularly at night, their voice somewhat resembles the sound of a bell.

2. *H. squirella*. Generally of a brown or cinereous colour above; in some irregularly varied or speckled with paler or darker: a black, or dusky, or bark brown band extends from the nostrils to the eyes, and a narrow white stripe from near the nostrils, along the upper lip reaches almost to the insertion of the fore legs: beneath whitish, granulate on the abdomen and under side of the thighs: *Head* rather obtuse; iris golden: *thighs* longer than the shanks, yellow on the exterior part: *legs* more or less distinctly barred with darker; hind toes semi-palmate.

Length one inch and a quarter.

Inhabits under logs, and the bark of decaying trees; I have never seen it in, or near the water.

The figure of this species in Daudin is very different from any specimen that I have ever seen, both in colour and in marks; I do not deny but that it may have been found of a green colour, as he represents it, and marked in the same manner; but the same error occurring in his delineation of the next species, I am inclined to think that it has been coloured from report and description, rather than from the animal itself: indeed,

whatever the colour may be, it can scarcely remain unchanged for six months in a preserved specimen ; all that I have ever attempted to preserve, lost their colour in less than two months. There are three principal varieties of this species.

- α. Above cinereous, with a straight, or curved, or angular bar between the eyes ; *back* with a few spots of dusky, sometimes confluent, and forming different figures of irregular shapes ; and sometimes uniting into a line on each side of the body, of greater or less length.
- β. Above cinereous, irregularly spotted with darker ; the line between the eyes broken into two or more spots.
- γ. Above entirely brown, without spots, exterior part of the thighs not yellow.

In all these, the dark band on the head, and the white line on the lips, are the only marks which remain constant ; in one variety, even the yellow colour on the thighs vanishes ; there are hardly any two individuals alike, and so different are they from one another, that a person who had not observed them accurately for a length of time, would be led to think, that there were almost as many species as individuals.

3. *H. femoralis*. Above dark cinereous, or pale brown, irregularly marked with a few confluent spots of darker or dusky, the one between the eyes the largest, triangular, truncate behind at the apex, the others oblong, a black, somewhat crenulate and interrupted line extends from the eyes to the insertion of the hind legs, and another shorter one of the same colour, from the same place to the insertion of the fore legs, forming an angle ; the first being bounded above on the fore part with pale cinereous or brown ; *beneath* whitish, granulate on the abdomen, and underside of the thighs : *Head* somewhat obtuse, irides golden, thighs longer than the shanks, darker on the exterior part, and spotted with yellow, the spots roundish, irregularly placed, and unequal in number ; fore and hind

legs bordered with dusky, the latter on the fore part, the former on the hind, and very obscurely barred with darker ; hind toes semi-palmate.

Length one and a half to one and three quarters of an inch.

3. *Above* brown, the greater part of the back occupied by a large irregular blotch of darker, containing two or three roundish spots of paler, legs strongly barred with darker.

Inhabits with the last.

4. *H.* delitescens.* *Above* cinereous, irregularly spotted and speckled with darker ; *beneath* whitish, granulate on the abdomen, and under side of the thighs : *head* somewhat obtuse, irides golden, lips whitish, chin speckled with brown, exterior part of the thighs, and the whole of the under side of both the fore and hind legs yellow ; region of the anus varied with cinereous ; legs not barred, but varied and speckled with darker, hind toes semi-palmate : somewhat larger than the last.

Inhabits Georgia, under the bark of decaying trees.

H. vernicolor.* *Broader*, and not so tapering in form as the others ; *above* covered with small warts, colour varying at the will of the animal, from pale brown to ash and green, with a few black spots ; at times when they are brown, the back is more or less marked with an acute angled cross, which, however, vanishes with a change of colour ; *beneath* white, granulate on the abdomen, and under side of the thighs : *head* and auricles small, irides golden, hind part of the abdomen and hind legs beneath yellow, hind legs of moderate length ; *toes* semi-palmate.

Length two inches.

Inhabits on trees in the Northern States. Has a moister or more viscid look than either of the other species, and more resembles a toad in form. Is considered by the vulgar as poisonous. During damp weather, or on the approach of rain, croaks continually.

It is surprising that this species, so common in the part of America that has been most visited by foreign naturalists, has as yet been noticed by no one. It may have been confounded with the *H. viridis* of Europe, which, however, it but little resembles.

The animals comprised in the division of reptiles called Batracian, have long claimed a considerable degree of attention from me, and I present indications of six new species, which on a future occasion I shall more fully describe, and accompany with the necessary figures.

1. *RANA* fontinalis*, or common spring frog; colour above varying from yellow green to dark olive, sometimes irregularly spotted with dusky, particularly on the sides, with a raised interrupted line extending from the eye towards the hind part of the body.
2. *RANA* palustris*, or marsh frog; colour above pale brown, with two longitudinal rows of dark brown spots on the back, and the same number on the sides, hind part of the thighs yellow, spotted with black.
3. *RANA* sylvatica*, or wood frog; colour above varying from light to dark brown, with two interrupted longitudinal lines of black, a dark brown stripe extending from the tip of the nose through the eyes, and covering the auricles.
4. *RANA* pumila*; pale green; back with a decurved line on each side, bounded with dusky, head with a triangular spot between the eyes, legs barred with dusky.
5. *RANA* gryllus*, (Savanna cricket;) above warty, colour various, with a triangular spot of darker on the top of the head between the eyes, and a paler line extending from the apex of this spot to the vent, hind part of the thighs yellowish or whitish, with one or two lines of dusky or brown.
6. *RANA* nigrita*; above black, speckled with small white warts; middle of the back cinereous with an interrupted stripe of black, upper lips with a white line; beneath granulate whitish; irides golden; legs barred with whitish, hind part of the thighs brown; hind legs very long.

MONOGRAPH of the *North American Species of CAREX.*
BY REV. LEWIS D. DE SCHWEINITZ. Edited by JOHN
EY. Read December 13, 1824.

Principal part of the following monograph has been
several years. About two years ago, the author,
on I have long enjoyed an active correspondence,
a copy of the work for my private use, with permis-
communicate it to the New-York Lyceum of Natural
; and I accordingly submitted it to that Society, who
that it should be published in their Annals. Various
the chief of which has been a desire to make it more
by additions and corrections, have delayed its ap-
until the present time. Mr. Schweinitz lately left
try for Europe, with the expectation of being absent
considerable period. Previous to his departure, he
in my possession his rich collection of Carices, giving
permission to make any additions or alterations in his
ipt, which my own observations or the recent dis-
of others might render necessary. This privilege I
ought proper to exercise to a considerable extent, the
himself having made no changes in the monograph
as first put into my hands. Within the last year, that
Mr. Elliott's work which includes the Carices, has been
d, and Professor Dewey's Caricography of the
n States has appeared in Silliman's Journal. Several
botanical publications have also been received, which
urnished important materials. Among them are
Appendix to Parry's Voyage, and Richardson's
x to Franklin's Narrative; the latter particularly.
bled me to make some valuable additions to the
uph. A copy of a new edition of this work, together
cimens of some of the rare Carices there described.
ldly presented to me by the author. I am also under

many obligations to my friends Professor Dewey of Williams College, E. Davis, Esq. of Westfield, Mass., and Dr. J. Barratt of Middletown, Conn., for numerous specimens of northern Carices, as well as for many valuable notes and observations.

JOHN TORRET.

West-Point Military Academy, May 28th, 1825.

GENUS CAREX Lin. Sedge.

Carex Lin. *gen. pl.* 1046. *Schreb. gen. pl.* 1407. *Gaert. i.* p. 12. *Lam. ill. gen. t.* 752. *Juss. gen. p.* 26. *Vent. fam. pl. ii.* p. 91. *Nutt. gen. ii.* p. 203. Nat. Ord. CALAMARIÆ Lin. CYPERACÆ (Cyperoidæ olim) *Juss. R. Brown, Agardh, &c.* In sys. sex. MONOECIA TRIANDRIA.

CH. GEN. *Flowers* glumaceous, generally monoicous, (never perfect,) disposed in one or more imbricated aments. *STAM. FL.* in the same spike with the pistilliferous, or in a separate spike. *Glumes* one-valved, one-flowered, (the inferior ones often empty,) lanceolate, concave, permanent. *Corolla* 0. *Stamens* 3, hypogynous; *filaments* capillary, longer than the glume; *anthers* erect, long-linear, cleft at the base, entire at the apex. *PISTIL. FL.* *Glumes* as in the staminiferous. *Corolla* (nectarium Lin.; capsule Pers. &c.; nux coriacea Gært.; urceole Lam.; arillus Gooden. Smith-perianthium R. Brown.; glumella Rich.; glum. infer. Turpis. Agardh,) one glumed (formed of 2-3 coalesced valves?) urceolate, surrounding and concealing the germen, opening at the summit by an entire or bidentate orifice, permanent. *Pistil*: *germen* superior, triangular or compressed, enclosed in the ventricose corolla; *style* simple, persistent; *stigmas* 2-3, exserted, subulate-linear, simple, incurved, pubescent. *Caryopsis* (nux Pers. &c.; achenium R. Br.) crustaceous, triquetrous (when there are three stigmas,) or subtriangular-compressed (when there are two stigmas.) *Embryo* enclosed at the base of the albumen.

HAB. ESSEN. Monoica (rariss. dioic ;) amentum (spica) ricatum ; gluma uniflora ; corolla ventricosa, 1-valvis sistens caryopsidem includens.

The genus *Carex* is the most numerous in species of the CYPERACEÆ. According to Agardh,* there are 328 species known to botanists. With very few exceptions they are exclusively found in the northern hemisphere, and they diminish in number towards the equator. Europe and North America contain about an equal number, and a few are common to both continents. Asia and Africa contribute but a small number of species. They are mostly natives of boggy marshy places.

The general habit of the Carices, is a creeping root, simple petioled culm, without joints ; coarse carinate leaves, and spiked inflorescence. The sheaths of the leaves are entire, longitudinally cleft as in the GRAMINEÆ, except when . . . At the base of the spike and spikelets there is usually a bractea which is sometimes foliaceous, at other times merely an enlargement of the lower glume.

On account of the great number of species in this genus, it is necessary to arrange them under analytical subdivisions. The objection, that the diagnostic characters of these are not sufficiently constant, does not appear to be well founded. It is true, doubts may arise concerning such characteristics, as their nature and terms, are relative, and therefore more or less ambiguous. But a very little practice will obviate this difficulty, and render the judgment of the examiner sufficiently correct to prevent serious mistakes. It is proper, in all cases, to observe a considerable number of specimens, in order to

Aphorismi Botanici, p. 141. This is a much greater number than is ascribed in the works to which I have access. The *Mém. sur les Graminées* of Turpin and the *Monog. Cyperac.* of Lestibond. I have never

prevent individual peculiarities from misleading ; and if this be done, the inconstancy complained of will be found by no means so great as is frequently imagined.

The North American species of *Carex* have been much neglected by botanists until within the last few years. Linnæus scarcely describes any other as peculiar to this country than *C. squarrosa* and *folliculata*. Walter in his *Flora Caroliniana*, published in 1788, gave short and imperfect descriptions of eleven species. Lamarck described five new North American species in his *Encyclopédie methodique*, published in 1789. In 1803, Wahlenberg published in the *Acta Holm.* (Kong. svenska vetenskaps akademiens Handlingar,) for 1803 a monography of the genus *Carex*, in which he described twelve new species from this country. About the same time appeared the *Flora Boreali-Americana* of Michaux, containing twenty-two species, of which seventeen were considered by that botanist as new, but his descriptions are so incomplete, that it is impossible, in many cases, to ascertain with certainty the species he intended to designate. The author does not appear to have been acquainted with the excellent *Beschreibung der Reidgraser* of Schkuhr, the first part of which was published at Leipsic in 1802. As regards the North American species, although Schkuhr did not enjoy an opportunity of examining living specimens, he has, with few exceptions, been very happy in a just description of the species, and his accurate figures are an almost infallible guide in recognizing what he describes. The first part of his work, however, is very deficient in American species. In 1805, vol. IV. part I. of Willdenow's *Species Plantarum* was published. This contained descriptions of forty-two North American Carices, most of which were sent to the author by the late Dr. Muhlenberg of Lancaster in Pennsylvania. Many of these species were previously determined and named by Muhlenberg himself, but others were left to be settled by his friend and correspondent. In 1806 appeared the second part or volume of

Schkuhr's monograph, which contained remarkably accurate coloured figures of nearly all the species described by Willdenow, to which he added several new ones sent from Pennsylvania by Muhlenberg. In 1804, several North American Carices were described by Rudge, in the *Transactions of the Linnean Society*, accompanied by very correct figures. The *Flora America Septentrionalis* of Pursh, which contains descriptions of sixty-four species of *Carex*, was published in London in 1814. It is very evident that this author has not bestowed much care upon the genus. He has introduced a number of European species, which have never been found by our most assiduous botanists, even when he asserts them to be very common. The greater part of these have been omitted in the following monograph.

Muhlenberg's posthumous work, entitled "*Descriptio uberius graminum et plant. calamariarum America Septentrionalis*," was published in 1817. In this work fifty-nine species of *Carex* are described. The descriptions of this author are very accurate as far as they go, being all taken from specimens which he had examined himself, but his work appears to be a mere sketch of what he intended to have made it. Still it is particularly valuable; all his species being identical with those of Willdenow and Schkuhr.*

The *Genera of North American plants* by Nuttall, published in 1818, enumerates sixty-eight species of *Carex*. Three of these are new and very accurately described. The author would doubtless have much increased their number, had not his labours been more directed to investigating the plants of the southern and western parts of our country, where the species of this genus are comparatively rare. Though the number of North American Carices is now so

* I had the good fortune to receive from Muhlenberg specimens of the greater part of his species.

great, there can be little doubt that many species still remain to be discovered. Very few have yet become known from the swamps and mountains of the southern states, merely, we have reason to believe, from want of attention at the proper season. The botany of the northern mountains of New-Hampshire and Vermont, is only beginning to be examined. Very large acquisitions may be expected when the cold regions of North America shall be carefully explored; for they doubtless contain as many species of this genus as the similar regions of Europe, which are found to be so remarkably fertile in them. It is, however, probable that most of them, and of the alpine species generally, will be found identical with the European ones of a similar climate.

I shall now proceed to give a conspectus of the whole genus and its analytical subdivisions, enumerating under each, all the species of which I have any knowledge, either from the books to which I could obtain access, or from actual specimens, and then give the history of such species as have fallen under my observation, at length, with shorter ones of such as I have not examined, but which appear to be sufficiently authentic. At the end of the work a list of the doubtful species will be given. As regards synonymy, it is hoped the monograph will be full enough for all useful purposes.

CONSPECTUS of the known species of *CAREX* under their proper
ANALYTICAL SUBDIVISIONS.

NB. The species printed in roman letters are North American. Those with an asterisk prefixed are common to Europe and North America.

A. Inflorescence dioicous.

= *C. dioica*, L.

— *Davalliana*, Smith.

C. *Wormskioldiana*, Hornem.

— *pichinchensis*, Kunth.

B. Inflorescence monoicous.

† All the spikes androgynous.

‡ Spike solitary.

a. Summit stamiferous.

1. Two stigmas.

C. capitata, L.

C. pulicaris, L.

(No American species in this section.)

2. Three stigmas.

C. Fraseri, Sims.

C. compacta, R. Br.

— *Willdenovii*, Schk.

— *Brownii* (UNCIN. ripar. R. Br.)

— *polytrichoides*, Muhl.

— *tenella*, R. Br.

— *affinis*, R. Br.

— *microglochin*, Wahl.

— *attenuata*, R. Br.

* — *pauciflora*, Lightf.

— *filifolia*, Nutt.

— *obtusata*, Liljeb.

— *uncinata*, L.

— *spicata*, Schk.

— *hamata*, Schwartz.

— *petraea*, Wahl.

— *erinacea*, Cavan.

— *rupestris*, Allion.

b. Summit pistilliferous.

C. squarrosa, L.

** Spikes several, aggregated into a head.

a. Summit staminiferous

C. cephalophora, Wahl.

b. Summit pistilliferous.

C. cyperoides, L.

*** Spikes distinct.

a. Summit staminiferous.

1. Two stigmas.

C. Villarsi, Schk.

C. disperma, Dewey.

— *Bertolinii*, Schk.

— *riularis*, Willd.

— *simpliciuscula*, Wahl.

— *stenophylla*, Wahl.

— *chordorrhiza*, L.

— *chlorantha*, R. Br.

— *tuberosa*, Degl.

— *Hostii*, Schk.

— *splendens*, Pers.

— *incurea*, Lightf.

— *fastida*, Allion.

— *stipata*, Muhl.

— *arenaria*, L.

— *vulpina*, L.

— *repens*, Ballard.

— *namorea*, Lumn.

— *bromoides*, Schk.

— *Muhlenbergii*, Schk.

— *intermedia*, Good.

— *glomerata*, Thunb.

— *assonophila*, Willd.

— *floridana*, nob.

— *sclanoides*, Host.

— *sparganioides*, Muhl.

— *divisa*, Good.

— *discula*, Good.

— *austriaca*, Schk.

— *multiflora*, Muhl.

— *inversa*, R. Br.

— *setacea*, Dewey.

— *lobata*, Vill.

* — *paniculata* L.

— *teretiuscula*, Good.

— *appressa*, R. Br.

— *retroflexa*, Muhl.

— *brunnea*, Thunb.

— *rosea*, Schk.

— *paradoxa*, Willd.

2. Three stigmas.

- | | |
|------------------------------|--------------------------------|
| <i>C. baldensis</i> , L. | <i>C. spartea</i> , Wahl. |
| <i>C. curvula</i> , Allion. | <i>C. indica</i> , L. |
| — <i>dielachya</i> , Willd. | — <i>polystachya</i> , Swartz. |
| — <i>pedunculata</i> , Muhl. | — <i>cladostachya</i> , Wahl. |
| — <i>ovata</i> , Rudge. | — <i>scabrella</i> , Wahl. |
| — <i>Linckii</i> , Schk. | — <i>cruciata</i> , Wahl. |
| — <i>capensis</i> , Thunb. | |

b. Summit pistilliferous.

1. Two stigmas.

- | | |
|-------------------------------|--------------------------------|
| <i>C. bicolor</i> , Allion. | <i>C. Deweyana</i> , nob. |
| — <i>tenuiflora</i> , Wahl. | — <i>arida</i> , nob. |
| — <i>leporina</i> , Good. | — <i>lagopodioides</i> , Schk. |
| — <i>Helconastes</i> , L. | — <i>scoparia</i> , Schk. |
| — <i>Norvegica</i> , Wahl. | — <i>tenera</i> , Dewey. |
| — <i>Grypus</i> , Schk. | — <i>brizoides</i> , L. |
| * — <i>Ioliacea</i> , L. | — <i>straminea</i> , Willd. |
| * — <i>stellulata</i> , Good. | — <i>fœnea</i> , Muhl. |
| — <i>trisperma</i> , Dewey. | — <i>cristata</i> , nob. |
| — <i>Schreberi</i> , Willd. | — <i>festucacea</i> , Schk. |
| — <i>scirpoides</i> , Schk. | — <i>elongata</i> , L. |
| — <i>remotiuscula</i> , Wahl. | — <i>axillaris</i> , Good. |
| * — <i>curta</i> , Good. | * — <i>remota</i> , L. |
| — <i>gibba</i> , Wahl. | — <i>lusitanica</i> , Schk. |
| — <i>Gebhardi</i> , Schk. | |

2. Three stigmas.

- | | |
|-------------------------------|--------------------------|
| * <i>C. atrata</i> , L. | <i>C. media</i> , R. Br. |
| — <i>magellanica</i> , Willd. | |

†† Only some spikes androgynous.

* Terminal spike stamiferous, the rest androgynous.

- | | |
|-------------------------------|-------------------------------|
| <i>C. Boryana</i> , Schk. | <i>C. longifolia</i> , R. Br. |
| — <i>thuringiaca</i> , Willd. | — <i>Fosteri</i> , Wahl. |
| — <i>fasciculata</i> , Linck. | — <i>ambigua</i> , Linck. |
| — <i>gracilis</i> , R. Brown. | — <i>depressa</i> , Linck. |

(No North American species in this section.)

** Terminal spike androgynous, the rest pistilliferous.

a. Two stigmas.

- | | |
|--------------------------------|--------------------------|
| <i>C. microstachya</i> , Ehrh. | <i>C. glauca</i> , Wahl. |
|--------------------------------|--------------------------|

b. Three stigmas.

- | | |
|----------------------------|----------------------------|
| <i>C. viridula</i> , Mich. | <i>C. Caroliniana</i> . |
| — <i>virescens</i> , Muhl. | — <i>misandra</i> , R. Br. |
| — <i>hirsuta</i> , Willd. | — <i>formosa</i> , Dewey. |

- mii, *Wahl.* — *parviflora*, *Host.*
 , *Muhl.* — *Vahlkii*, *Schk.*
 sa, *Schk.* — *Davisii*, *Torrey.*
 † *Staminiferous and pistilliferous spikes distinct.*

* *Staminiferous spike solitary.*

a. *Two stigmas.*

- i, *L.* *O. fusca*, *Schk.*
 ta, *R. Br.* — *cuspidata*, *Wahl.*
 Good. — *mutica*, *R. Br.*
 food. — *Novæ Angliæ*, *nob.*
 r, *R. Br.* — *aurea*, *Nutt.*

b. *Three stigmas.*

1. *Pistilliferous spikes sessile, or with the peduncle enclosed.*

- ya, *Thunb.* *C. nigra*, *Allion.*
Muhl. — *pilulifera*, *L.*
 leonii, *R. Br.* — *marginata*, *Muhl.*
 a, *R. Br.* — *lupulina*, *Muhl.*
 um, *Poll.* — *folliculata*, *L.*
 z, *L.* — *xanthophysa*, *Wahl.*
 Jacq. — *subulata*, *Nich.*
 ata, *Schk.* — *clavata*, *Thunb.*
 ea, *L.* — *borbonica*, *Lam.*
Willd. — *extensa*, *Good.*
 pa, *Muhl.* — *pedata*, *L.*
 ata, *Allion.* — *ornithopoda*, *Willd.*
 rii, *Willd.* — *digitata*, *L.*
Willd. — *clandestina*, *Good.*
 arpa, *Willd.* — *livida*, *Wahl.*
 ris, *Willd.* — *firma*, *Host.*
 chya, *Schk.* — *approxinata*, *Allion.*
 na, *Muhl.* — *umbrosa*, *Host.*
Ehrh. — *fimbriata*, *Schk.*
 * — *alpestris*, *Allion.*
 lata, *Muhl.*

2. *Pistilliferous spikes on exsert peduncles partly sheathed at the base.*

- enke. *C. breviculmis*, *R. Br.*
 i, *Smith.* — *cataracta*, *R. Br.*
 z, *Schk.* — *oligocarpa*, *Schk.*
 inea, *Lam.* — *scabrata*, *nob.*
Muhl. — *panicea*, *L.*

- *ferruginea*, Schk.
- *lavis*, Kitaib.
- *frigida*, Allion.
- *Micheli*, Host.
- *Meilichhoferi*, Schk.
- *striata*, R. Br.
- *lacioma*, R. Br.
- *depauperata*, Good.
- *pilosa*, Scop.
- *conoidea*, Schk.
- *tetanic*, Schk.
- *subspathacea*, Wormsk.
- *laxiflora*, Lam.
- *granularis*, Muhl.
- *conglobata*, Kitaib.
- *chinensis*, Retz.
- *vena*, Schk.
- *pendula*, Good.
- *psyllostachya*, Kitaib.
- *strigosa*, Good.
- *fulva*, Good.
- * — *distans*, L.
- * — *capillaris*, L.
- * — *ustulata*, Wahl.
- *lavigata*, Smith.
- * — *sylvatica*, Huds.
- *flexuosa*, Schk.
- *podocarpa*, R. B.

3. *Pistilliferous spikes on long peduncles—
nearly destitute of sheaths.*

- C. *umbellata*, Schk.
- *japonica*, Thunb.
- *rotundata*, Wahl.
- *Grioleti*, Roem.
- *brachystachya*, Schrank.
- *compressa*, Kitaib.
- *miliacea*, Muhl.
- * — *pallens*, L.
- *hystericina*, Willd.
- * — *pseudo-cyperus*, L.
- C. *glaucescens*, Elliott.
- *castanea*, Wahl.
- *Elliottii*, Torrey.
- *Scopoliana*, Willd.
- * — *limosa*, L.
- *laxa*, Wahl.
- *chlorostachys*, Steven.

** *Several stamiferous spikes.*

a. *Two stigmas.*

- * C. *cespitosa*, L.
- * — *stricta*, Good.
- *trinervis*, Loisel.
- *geminata*, Schk.
- *crinita*, Lam.
- * C. *acuta*, L.
- *salina*, Wahl.
- *hispida*, Willd.
- *maritima*, Vahl.
- *aquatilis*, Wahl.

b. *Three stigmas.*

- C. *glauca*, Scop.
- *Barrattii*, Torrey.
- *ampleocarpa*, Willd.
- *trichocarpa*, Muhl.
- *verrucosa*, Muhl.
- *Schraderi*, Schk.
- * — *filiformis*, L.
- *pumila*, Thumb.
- *nutans*, Host.
- C. *aristata*, R. Br.
- *serrulata*, Bernard.
- *vesicaria*, L.
- *plumbea*, Wahl.
- * — *ampullacea*, Willd.
- *retroscissa*, nobis.
- *Schweinitzii*, Dessey.
- *bullata*, Schk.
- *secalina*, Willd.

<i>cuminata</i> , Willd.	— <i>hordeiformis</i> , Wahl.
<i>ellita</i> , Muhl.	— <i>littorea</i> , Labillard.
<i>obusosa</i> , Good.	— <i>hirta</i> , Wahl.
<i>iparia</i> , Good.	— <i>cherokeensis</i> , nobis.
<i>acustris</i> , Willd.	— <i>trifida</i> , Cavan.
<i>nelanostachya</i> .	— <i>longirostris</i> , Torrey.

A. Inflorescence dioicous.

1. *CAREX dioica*, Linn.

ica simplicis; fructibus erectiusculis, ovatis, nervosis, perne margine hispidis; foliis culmisque glabris.

ioica, Lin. Willd. *sp. pl.* iv. p. 207. Richardson, *app. ank. nar.* ed. 2. p. 34. No. 364.

innæana, Schk. *car.* ii. p. 3. t. A. f. 1.

creeping. Culm 6—8 inches high, slender, triquetrous. Leaves rather than the culm. Spikes oblong; glumes brownish, with a red keel. *mas* 2.

In the woody country of Arctic America, from latitude 54° to 64° north. Collected by Dr. Richardson.

2. *CAREX sterilis*, Willdenow.

picis dioicis, staminif. 3—5, pistillif. subsenis (interdum drogynis); fructibus ovatis, compresso-triquetris, margine ciliato-serratis, apice recurvis, bicuspidatis.

sterilis, Willd. *sp. pl.* iv. p. 208. Schk. *car.* t. mmm. 146. *bona*. Pursh *fl. Amer. Sept.* i. p. 34. Muhl. *gram.* 217 Elliott. *sk.* ii. p. 525.

strong, fibrous. Culm a span high, obtusely triquetrous, striate, (and once appearing hexangular) scabrous toward the summit, brownish and sheathed by the leaves at the base. Leaves as long as the culm; the lower ones shortened, linear, narrow, triquetrous toward the extremity; upper ones scabrous. Spikes occasionally (according to Muhlenberg) anogynous; *sterile** spikes 3—5, alternate, approximate, oblong, acute,

[I shall use the terms sterile or staminiferous, and fertile or pistilliferous indiscriminately.

sessile; *glumes* light brown or yellowish: *fertile spikes* 5—6, situate as the sterile, but shorter and more obtuse; *glumes* greenish-yellow, almost of the size of the fruit; at the base of the lowest spike is a short *bractea*, which is often wanting. *Fruit* triquetrous and compressed, acuminate, and with the summit bicuspidate, smooth. *Stigmas* 2.

HAB. In marshes, Pennsylvania. Flowers in May. *Mullenberg*. In the Cherokee country.

I have never met with this species either in Pennsylvania or in North Carolina, and am inclined to suspect that particular states of *C. varia*, in which the fertile spikes are occasionally very inconspicuous, have sometimes been mistaken for it; but the plural number of the sterile spikes will always distinguish it.

8. *CAREX Wormskioldiana*, Hornemann.

C. spica solitaria, imbricato-cylindrica; fructibus ovalibus, subrostratis, dense pubescentibus; foliis planis, culmo superneque scabris.

C. Wormskioldiana, Hornemann, *fl. dan.* t. 1528.

C. scirpoidea, Mich. *fl. bor. Amer.* ii. p. 171. Pursh *fl. Amer. Sept.* i. p. 34. Richard. *app. Frank. nar.* ed. 2. p. 34. No. 365.

C. Michauxii, Schw. *an. tab. car. in Annals of Lyceum*, i. p.

Root creeping. *Culm* 3—6 inches high, clothed at the base with dark brown sheaths, nearly terete, smooth. *Leaves* linear, flat, about a line broad, longer or shorter than the culm, smooth, apex triquetrous. *Spikes* oblong-cylindrical, acute, half an inch or more in length; *glumes* dark brown, acute, minutely ciliate. *Fertile spikes* not seen.

HAB. In the woody country of Arctic America. Dr. Richardson.

Obs. This species is nearly allied to *C. dioica*. Dr. Torrey possesses specimens presented him by Dr. Richardson, collected by that enterprising naturalist during his arduous journey with Capt. Franklin. There are no fertile spikes among them. The name given to this species by Michaux, was changed to *C. Michauxii* in the Analytical Table

above quoted, as it was too similar to *C. scirpoides*, a species established many years ago by Schkuhr; but according to R. Brown, Michaux's plant is identical with the *C. Wormskioldiana* of Hornemann, and as the name *C. scirpoides* must be changed, we have substituted for it, (although so very barbarous) that of the Danish botanist.

B. Inflorescence monoicous.

* *All the spikes androgynous.*

† *Spike solitary.*

a. *Summit staminiferous.*

1. *With two stigmas.*

There are no North American species of this section known.

2. *With three stigmas.*

4. *CAREX Fraseri*, Sims.

C. spica simplicis, ovata; fructibus ovato-subglobosis, ore integris, gluma oblonga longioribus; foliis lanceolatis, undulatis, crenulatis; scapo basi vaginato.

C. Fraseri, Sims bot. mag. 1391. Bot. rep. 639. Pursh fl. Amer. Sept. ii. p. 39.

C. Lagopus, Muhl. gram. p. 265. No. 59.

HAB. On mountains of North Carolina. *Fraser*. In Tiger Valley, Pennsylvania. *Muhlenberg*. Flowers in gardens in April.

Obs. This plant, to my knowledge, has not been collected by any American botanist. I have never seen a specimen of it, but am informed that it is cultivated in Mr. Prince's garden at Flushing. Dr. Torrey found no specimen of it in the herbarium of Muhlenberg, and there are reasons for believing this botanist was misinformed respecting the *habitat* of his plant, though there can be little doubt that it is identical with *C. Fraseri*.

5. *CAREX Willdenovii*, Schkuhr.

C. spica simplicis, ovata; floribus staminiferis et pistilliferis subsenis; fructibus ovato-subglobosis, rostratis; glumis

ovatis acuminatis, infimis longissimis, foliaceis, spica multo longioribus.

- C. Willdenovii*, Schk. car. ii. p. 33. t. Mmm. f. 145. Willd. sp. pl. iv. p. 211. Pursh fl. Amer. Sept. i. p. 29. Muhl. gram. p. 230. Elliott sk. ii. p. 527.

Culm from a span to a foot in height, very slender, shorter than the leaves, acutely triquetrous, leafy below, brownish at the base. *Leaves* long, linear, slightly scabrous, flat, 1—2 lines broad. *Spike* about three fourths of an inch long, simple: *stamiferous flowers* mostly 6, closely approximate, forming a very short summit to the spike; *glumes* oblong, obtuse: *pistilliferous flowers* 3—6; *glumes* ovate, acuminate, in the lowest flowers foliaceous and much longer than the spike. *Fruit* comparatively large; when immature ovate, acuminate, at length subglobose with an abrupt somewhat scabrous beak, straight; base smoothish.

HAB. In dry rocky woods; rarely in swamps. Flowers in the latter part of May and beginning of June; rare. Pennsylvania to North Carolina.

- OBS.** 1. *Culm* cespitose, usually about three from each radical sheath. The two inferior glumes 1—2½ inches long.
2. This species, when young, has much the habit of *Scirpus planifolius*, Muhl.

6. *CAREX polytrichoides*, Muhlenberg.

C. spica simplici; fructibus oblongo-lanceolatis, compresso-triquetris, obtusis, emarginatis; glumis oblongis, obtusis, mucronatis.

- C. polytrichoides*, Muhl. in Willd. sp. pl. iv. p. 213. Schk. car. t. lii. f. 138. Pursh fl. Am. i. p. 29. Muhl. gram. p. 230. Dewey caricog. in Sill. jour. ix. p. 258.

C. leptalea, Wahl. Act. holm. 1803. p. 139.

C. microstachya, Mich. fl. bor. Amer. ii. p. 169.

Root fibrous. *Culm* a span or more high, longer than the leaves, and almost naked, triquetrous and retrorsely scabrous on the margin, very slender. *Leaves* mostly subradical and annuotinous, very narrow, grooved, becom-

ing convolute when dry, somewhat scabrous. *Spike* solitary, oblong-linear, with 4—8 *sterile florets* at the summit: stamiferous *glumes* oblong, obtuse, or rather acute, greenish, with a broad margin, somewhat carinate: *fertile florets* about 5; *glumes* ovate, carinate, mucronate, the lowest one often elongated, but scarcely foliaceous. *Fruit* obtusely triquetrous, oblong, slightly nerved and smooth; *stigmas* brown.

HAB. On dry hill sides and in bogs. Flowers in May; rather common. Canada to Pennsylvania. Not hitherto found in the Southern States.

OBS. *C. Willdenovii*, Dewey, l. c. ix. p. 258. is a variety of this plant.

7. *CAREX affinis*, R. Brown.

C. spica simplicis, pauciflora, laxa; glumis lanceolatis, acutis, muticis, infima aristata; foliis planis.

C. affinis, R. Brown in Rich. app. Frank. nar. ed. 2. p. 35. No. 367.

Culm 6 inches high, triquetrous, leafy at the base, somewhat scabrous.

Leaves one line broad, filiform at the apex, shorter than the culm. *Spike* half an inch long, oblong; summit sterile, obtuse, as broad as the inferior fertile part; *glumes* loosely imbricated, fuscous, with a scabrous discoloured margin: *fertile flowers* about 5; *glumes* resembling those of the sterile florets, the lowest one produced into a cusp or short bristle.

Fruit—

HAB. In the woody region of Arctic America. Dr. Richardson.

OBS. This species is allied to *C. polytrichoides*, but differs in its obtuse loose-flowered spike and fuscous glumes. The fruit is immature in Dr. Torrey's specimen, which was received from Dr. Richardson.

8. *CAREX attenuata*, R. Brown.

C. spica simplicis; superne staminifera densa; pistilliferis paucioribus alternis; glumis omnibus obtusis.

C. attenuata, R. Brown in Rich. app. Frank. nar. ed. 2. p. 35. No. 368.

HAB. In the woody country of Artic America. *Dr. Richardson.*

OBS. Of this species we have no specimens.

9. *CAREX filifolia*, Nuttall.

C. spica simplici, subcylindrica, acuta; fructibus subglobosis, ore integris; glumis retusis; foliis involuto-filiformibus, subulatis, recurvis; arista stricta (exserta vel inclusa.)

C. filifolia, *Nutt. gen. ii*, p. 204. *Richardson*, l. c. p. 35. No. 366.

Cespitose. *Culm* about 6 inches high, clothed at the base with scarious brown sheaths, the lowest of which are finely lacerate, triangular and grooved, leafy at the base. *Leaves* radical, longer than the culm, filiform, recurved or spreading, slightly scabrous. *Spike* three fourths of an inch long: superior sterile part consisting of densely imbricated florets; glumes very broad, retuse and somewhat eroded at the summit, brown, with a scarious margin; fertile florets 6—8, loose; glumes roundish with broad scarious margins. *Fruit* subpubescent without nerves, shorter than the glume, (not seen in a mature state); orifice a little oblique, scarious. *Seed* with a short straight awn at the base which is scarcely exserted. *Stigmas* 2.

HAB. On the dry plains and gravelly hills of the Missouri. *Nuttall*. In the woody country of Arctic America. *Dr. Richardson.*

OBS. Nearly allied to *C. petraea*, Wahl.

10. *CAREX pauciflora*, Lightfoot.

C. spica subquadriflora; flora staminifera terminali subsolitaria; fructibus lanceolatis, teretibus, reflexis; glumis pistilliferis caducis.

C. pauciflora, *Willd. sp. pl. iv*. p. 211. *Schk. car. t. A. f. 4.*

Root fibrous. *Culm* triangular, a span high, leafy at the base, very smooth. *Leaves* shorter than the stem, convolute-triangular, the lower ones abbreviated, with brown sheaths. *Spike* of about 4 fertile flowers, and 1—3 sterile ones at the summit; sterile glumes linear-lanceolate, brown, fertile florets alternate on a jointed rachis. *Fruit* large compared with

the size of the spike, acute, smooth, pale yellow and striate, reflexed when mature; orifice entire. Seed long, cylindrical; stigmas 3.

HAB. In a sphagnous bog, Ashfield, Massachusetts. Sent to Dr. Torrey by Dr. Porter of Plainfield. Flowers in June.

OBS. The Massachusetts specimens agree in all respects with the European *C. pauciflora*.

C. Summit pistiliferous.

11. *CAREX squarrosa*, L. t. xxiv. f. 2.

C. spica simplicis, crassissima, oblongo-cylindrica; fructibus imbricatis, horizontalibus, glabris, subsquarrosis, apice bidentatis, glumis lanceolatis longioribus.

C. squarrosa, Willd. *sp. pl.* iv. p. 215. *Muhl. gram.* p. 231. *Elliott sk.* ii. p. 526. *Dewey caricog.* in *Sill. Jour.* vii. p. 270. No. 2..

C. typhina, Mich. *fl.* ii. p. 169.

Root fibrous. Culm about two feet high, rather slender, sharply triquetrous, nearly smooth, deeply furrowed, leafy. *Leaves* always longer than the culm, with a short abrupt sheath, furrowed, scabrous; the upper ones very narrow and long; all are more or less spreading, and not erect. *Spike* usually solitary and terminal; frequently, however, there are two and even three spikes, from one inch to two inches in length, and more than half an inch in diameter, rounded above and below; *sterile florets* at the base of the spike, dry and decurrent on the peduncle; *glumes* oblong, distant, brown, with a greenish midrib not produced at the apex; *fertile glumes* similar. *Fruit* horizontal, (erect when young) turbinate and inflated below, strongly nerved and produced into a long conical rostrum, which is bifid and recurved at the apex. *Seed* much smaller than the envelope, obtusely triangular, punctate.

HAB. In bog meadows; rather rare; June. Canada to Georgia, but not in the low country of the southern States.

OBS. This is the most beautiful and singular of all the North American Carices. It appears to have been overlooked by Pursh, or he has strangely confounded it with *C. cephalophora*, a species which it is totally unlike. It has not been

figured either by Schkuhr or any other author to whom we have had access.

** *Spikes several, aggregated into a head.*

a. *Summit staminiferous.*

12. *CAREX cephalophora*, Muhlenberg.

C. spiculis in formam ellipticam aggregatis; fructibus ovatis, margine superne scabris, glumis ovatis mucronato-aristatis subæqualibus.

C. cephalophora, Willd. *sp. pl.* iv. p. 220. Schk. *car.* t. Hhh. f. 133. Pursh *fl.* i. p. 35. excl. syn. Mich. Muhl. *gram.* p. 118. Elliott *sk.* ii. p. 516. Dewey l. c. vii. p. 269. No. 1.

Root fibrous. Culm 1—2 feet high, almost naked, or only leafy at the bottom, tough and wiry, erect or decumbent, acutely triangular, and retrorsely scabrous on the margin, striate, sheathed below. Leaves long-linear, furrowed; midrib rounded and prominent. Spikes 3—4—6 of a more or less cylindric shape, growing in contact at the base so as to form a distinct head, which appears to be trifid below, obtuse. Sterile florets at the summit of each spikelet. Glumes shorter than the fruit, ovate, carinate, cuspidate, and minutely ciliate on the margin, of a greenish colour. Two subulate bracts at the base of the compound spike, about equal to it in length, generally spreading or recurved. Fruit ovate, compressed, nerved or nerveless, with an acuminate, recurved, bifid apex, serrulate on the margin. Seed ovate.

HAB. On grassy hill sides and shady river banks, often in very dry situations; Canada to Carolina: common. May.

OBS. This species which usually grows in tufts in dry soils, is seldom above twenty inches high; but on river banks I have often found it growing 4 or 5 feet in length, decumbent among the bushes.

*** *Spikes distinct (not aggregated into a head.)*

a. *Summit staminiferous.*

12. *CAREX bromoides*, Schkuhr.

C. spiculis pluribus (4—6) alternis, oblongis, erectis, suprema superne staminifera, cæteris pistilliferis, vel androgynis

inferne superneve staminiferis ; fructibus erectis, lanceolatis, acuminatis, scabris, nervosis, bifidis, gluma ovato-lanceolata longioribus.

- C. bromoides*, Willd. *sp. pl.* iv. p. 258. *Schk. car.* t. Xxx. f. 176. bona. *Pursh fl.* i. p. 35. *Muhl. gram.* p. 219. *Elliott sk.* ii. p. 528. *Dewey l. c.* viii. p. 264.

Culm a foot or more in height, when tall, generally decumbent, a little leafy below, (the annotinous shoots bearing the chief parts of the leaves in the loose tuft) slender, triquetrous and scabrous. *Leaves* narrow, scabrous on the margin, at first longer, but at length shorter than the culm; *sheaths* smooth, whitish, membranaceous. *Spikelets* sometimes only 2—3, the lower ones at some distance from one another, upper ones crowded, few-flowered; sometimes the uppermost one is sterile below, the others being androgynous, with sterile florets both above and below; generally there are but about two sterile florets on the summit of each spike; occasionally an entire sterile spike occurs; at the base of the lowest spike is a small deciduous lanceolate scabrous bractea. *Sterile glumes* oblong-lanceolate, mucronate, shorter than the fruit, chaffy, brown, with a green midrib. *Fruit* obscurely triangular, attenuated into a short bifid neck, scabrous on the distinct margin. *Seed* compressed.

HAB. In wet boggy places: common. Flowers in May.

OBS. There is some contradiction in the description of this plant by Willdenow, Schkuhr and Muhlenberg, principally owing to the ease with which, both in a living state and in dried specimens, certain parts of the fructification are lost. Still it is a species easily recognised when once known.

14. *CAREX retroflexa*, Muhlenberg.

C. spiculis subquaternis, subapproximatis, ovatis, infima brevi-bracteata; fructibus ovato-lanceolatis, bidentatis, margine glabris, reflexo-patentibus, glumis ovatis acutis subæqualibus.

- C. retroflexa*, *Schk. car.* ii. p. 11. t. Kkk. f. 140. bona. *Willd. spec.* iv. p. 235. *Pursh fl.* i. p. 35. *Muhl. gram.* p. 219. *Dewey l. c.* vii. p. 271. *Elliott sk.* ii. p. 528.

Culm 6 inches to a foot or more in height, nearly hexangular, (i. e. triangular, with an elevation on each side) smooth and leafy below, scabrous above. *Leaves* mostly radical, shorter than the culm, linear, narrow, pale green, the exterior ones abbreviate and brownish; *sheaths* marcescent, mucronate. *Spikes* 3—4—5 (sometimes 9 Muhl.) the upper ones crowded and subconfluent, the lowest rather distant, few-flowered: *sterile florets* about 2, deciduous. *Glumes* ovate, sometimes oblong-lanceolate, mucronate, usually a very little shorter than the fruit, brownish, with a green midrib. At the base of the lowest spikelet the glume is produced into a setaceous *bractea*, which is often half an inch or more in length, but very deciduous. *Fruit* obscurely triangular with a short bifid neck, margin rounded and quite smooth, when mature retroflexed or very divergent. *Seed* smooth, compressed, brown.

HAC. In grassy woods and meadow margins; rather common in the northern States.

Obs. Allied to *C. rosea*, of which it has been suspected to be a small variety. It is distinguished, however, by the scale of the fruit, which is ovate, obtuse, and about half the length of the *C. rosea*. In that species the spikes are much larger and more distant, and the margin of the fruit is scabrous.

15. *CAREX rosea*, Schkuhr.

C. spiculis 4—6, remotis, subnovemfloris; *bractea* setacea sub infima spicam superante; *fructibus* ovatis, acuminatis, divergento-radiatis; *marginibus* scabris, distinctis; *glumis* ovatis, obtusis, *fructu* duplo-brevioribus.

C. rosea, Willd. *sp. pl.* iv. p. 238. Schk. *car.* ii. p. 15. t. Zuz. f. 179. opt. Pursh *fl.* i. p. 36. Muhl. *gram.* p. 233. Elliott *sk.* ii. p. 531.

C. echinata β . *radiata* Wahl. *act.* Holm. 1803. p. 147.

Culm usually about a foot high, sometimes much lower, and occasionally two feet long when it is decumbent, triquetrous, with two of the sides elevated into ridges, naked, or only leafy below. *Leaves*, linear, very narrow, equalling the culm except when the plant is unusually tall; the lower marcescent sheaths leafless. *Spikelets* 3—4—5—6, the lower ones nearly an inch remote from each other, the two upper closely

approximate, each containing at least 9, and frequently 12 florets, of which but one or two at the summit are sterile and deciduous. At the base of the lowest spike is a setaceous bractea overtopping the culm. Also another shorter beneath the next spike. *Glumes* generally only about half the length of the fruit, obtuse. *Fruit* ovate or oblong-lanceolate, flat, and a little concave on the inner side, with a very distinct acute margin, which is ciliate-scabrous under a lens.

HAB. In moist woods and along the margin of wet meadows; rather common. Flowers in May. Grows in dense tufts.

OBS. Sterile florets rarely seen, except in the flowering state. Spikes yellowish green.

16. *CAREX disperma*, Dewey.

C. spiculis subternis, remotiusculis subbifloris, erectiusculis, infima bracteata; fructibus ovatis, obtusiusculis, nervosis, plano-convexis, glabris, scabro-marginatis, ore integro gluma ovata obtusa submucronata duplo longioribus.

C. disperma, Dewey l. c. viii. p. 266. t. 1. f. 3.

Culm 6—12, slender, triquetrous, scabrous above, leafy below. *Leaves* chiefly proceeding from numerous annottinous shoots, rather shorter than the culm. *Spikes* rarely more than 3, sometimes 2 or 4, rather distant, mostly with 2 fertile flowers, (sometimes one or three flowered) and a sterile floret between and above them; the lowest, sometimes the two lower, supported by an ovate bractea often ending in a long slender point. *Stamiferous glume* lanceolate, white; *pistilliferous* ovate, acute or cuspidate. *Fruit* ovate, slightly acuminate, but not acute when mature, much longer than the glume, with a distinct acute scabrous margin, spreading a little, but not divaricate.

HAB. In wet mountain woods; Massachusetts, particularly in Williamstown. Dewey. Flowers in May and June.

OBS. 1. When the spikelets are one-flowered, the barren florlet is lateral. 2. This species is nearly allied to *C. loliacea*, L. (*Schk. car.* t. Pp. f. 104.) but differs in having the sterile flowers superior. It still more resembles *C. gracilis*, *Schk. car.* t. E. f. 24. which Schkuhr considers but a variety of the preceding.

17. CAREX Muhlenbergii, Schkuhr.

- C. spiculis alternis subquinis, ovatis, conferto-approximatis, basi bracteatis; fructibus lato-ovatis, compressis, nervosis, bifidis, subdivergentibus, margine scabris, gluma ovata mucronata paulo brevioribus.*
- C. Muhlenbergii, Willd. sp. pl. iv. p. 231. Schk. car. t. Yyy. f. 178. (opt.) Pursh fl. i. p. 36. Muhl. gram. p. 221. Dewey l. c. viii. p. 265. Elliott sk. ii. p. 529.*

Culm 1—2 feet high, firm and thicker than is usual in this genus, triangular with the sides a little convex, scabrous on the angles above, smooth and leafy below. *Leaves* broad-linear, about as long as the culm, smooth, with the exception of a slight roughness on the margin. *Spikes* 5—7, the uppermost one often almost entirely composed of sterile florets, sometimes so closely approximate as to form a kind of head. At the base of each (except of the uppermost) is an ovate bractea, terminating in a scabrous awn longer than the spike. *Sterile glumes* lanceolate, acuminate; *fertile* ovate, long-mucronate, subciliate. *Fruit* much compressed, somewhat concavo-convex, minutely ciliate on the distinct margin, bidentate, nerved, at length diverging.

HAB. Along borders of rocky woods, generally in mountainous districts; abundant in the highlands of New-York, growing in company with *C. cephalophora*. It has not occurred to me at Salem, but Mr. Elliott has recorded it as a southern species. Flowers in the middle of May.

Obs. Allied to *C. cephalophora*, but the spikes never form so distinct a head, and it differs essentially in the fruit and glumes. The whole plant is dark green.

18. CAREX stipata, Muhlenberg.

- C. spica composita, oblonga; spiculis plurimis (10—15) oblongis aggregatis, bracteatis; bracteis spiculæ paulo longioribus; fructibus lanceolatis, inferne subteretibus, glabrisve, patentibus, apice bidentatis, scabris, glumis duplo longioribus.*

- C. stipata*, Willd. *sp. pl.* iv. p. 233. *Schk. car.* t. Hhh. f. 132. *Pursh fl.* i. p. 35. *Muhl. gram.* p. 220. *Dewey car.* l. c. vii. p. 271. *Elliott sk.* ii. p. 529.
C. vulpinoidea, Mich. *fl.* ii. p. 169.

Culm 1—3 feet high, rather thick and succulent, triquetrous, smooth, except on the edges which are scabrous, leafy above. *Leaves* usually shorter than the culm, (longer when young) broad-linear; *sheaths* transversely veined. *Spikes* formed of numerous crowded and aggregated spikelets, the lower ones diverging. At the base of each is usually a subulate bractea, shorter than the spikelet. *Glumes* lanceolate, acuminate, carinate, scabrous, shorter than the fruit. *Fruit* oblong-lanceolate, ending in a long bifid apex, which is scabrous and marked by pretty strong nerves.

HAB. In wet meadows and swamps; common throughout the United States. Flowers in the end of April.

OBS. Nearly allied to *C. vulpina* of Europe, but differs in its less compound spike, &c.

19. *CAREX sparganioides*, Muhlenberg.

C. spiculis suboctonis, multifloris, supremis approximatis, infimis subdistantibus, bracteatis; fructibus ovatis, compressis, acuminatis, bifidis, divergentibus, margine scabris, gluma ovata mucronata duplo longioribus.

C. sparganioides, Willd. *sp. pl.* iv. p. 237. *Schk. car.* Lll. t. 140. (opt.) *Pursh fl.* ii. p. 36. *Muhl. gram.* p. 233. *Dewey car.* l. c. viii. p. 265. *Elliott sk.* ii. p. 531.

Culm about 2 feet high, triquetrous, scabrous, leafy below, fistulous. *Leaves* broad-linear, generally exceeding the culm; *sheaths* white. *Spikes* numerous, (8—10) clustered above, 2—4 of the lowest rather remote, with ovate scabrous bractea at the base. *Sterile florets* few. *Glumes* ovate, mucronate, yellowish green. *Fruit* much compressed above, horizontal, and often a little reflexed, not nerved, yellowish when mature, distinctly bidentate, minutely ciliate on the margin.

HAB. In marshy meadows; not common, but found in most parts of the United States. Flowers about the end of May.

Obs. In Schkuhr's figure, the bractæ at the base of the spikelets are altogether omitted.

20. *CAREX floridana*.*

C. spiculis (3—4), aggregatis, confertis, bracteatis; fructibus subtriquetro-compressis, longe-acuminatis, suberectis, obsolete marginatis, antrorsum undique ciliato-pilosis.

Culm cespitose, triquetrous, subfiliform, about six inches high, shorter than the leaves, scabrous, deeply striate. *Leaves* very long, rigid, canaliculate, mostly recurved, scabrous on the margin. *Spikelets* aggregated into an ovate head, the lowest one sometimes a little remote, and furnished with a long rigid bractea, all androgynous, but the uppermost one consisting mostly of sterile florets. *Glumes* lanceolate or ovate, obtuse or mucronate, whitish, with a green keel. *Fruit* obscurely triangular, almost rostrate, hairy towards the summit. *Stigma* always two.

HAB. In the sands of East Florida. Communicated by Capt. Le Conte of the U. S. Army.

Obs. This appears to be a very distinct species, but is evidently allied to *C. Muhlenbergii* and *C. sparganioides*.

21. *CAREX multiflora*, Muhlenberg.

C. spica oblonga, decomposita, bracteata, interrupta; spiculis conglomeratis, ovato-oblongis, obtusis; fructibus ovalis, acuminatis, compressis, confertis, bifidis, trinervis, margine ciliato-serrulatis, divergentibus, gluma ovato-cuspidata paulo minoribus.

C. multiflora, Willd. *sp. pl.* iv. p. 243. Schk. *car.* Lll. f. 144. (pl. jun.) Pursh *fl.* i. p. 36. Muhl. *gram.* p. 222. Dewey *car.* l. c. ix. p. 60. Elliott *sk.* ii. p. 530.

C. microsperma, Wahl. *act. Holm.* 1803. No. 30. Ren's *Cyclop.* No. 54.

C. bracteosa, Schw. *anal. tab. car.* l. c.

Culm about two feet high, leafy at the base, where it is obtusely triangular and scabrous above. *Leaves* broad-linear, canaliculate, longer than the culm, narrowing very gradually; *sheaths* truncate, and striped trans-

versely. *Spike* decompound and somewhat paniculate, formed of numerous small spikelets, which are clustered into 8—10—12 longer spikelets a little separate from each other, either appressed to the rachis, or somewhat diverging. At the base of each is a long filiform foliaceous bractea rigidly diverging at first, but at length contorted. *Sterile glumes* lanceolate, with a short point; fertile ovate, with a longer serrulate point, both carinate. *Fruit* diverging considerably, distinctly 3 nerved, yellowish when mature.

HAB. In wet meadows; common. Flowers in May.

Obs. A variable species as to size and appearance. When very tall, with flexuous filiform foliaceous bracteæ, it is *C. bracteosa* of the Analytical Table. According to Dr. Torrey, *C. polymorpha* of the same table is also a variety or diseased state of the plant, in which the culm is simple, or divided into several filiform branches, each bearing spikes mixed with numerous long infertile scales.

22. *CAREX setacea*, Dewey.

C. spica oblong, decomposita, bracteata; spiculis glomeratis, ovatis, obtusis, fructibus ovatis, acuminatis, compressis, bifidis, subdivergentibus, gluma ovato-lanceolata aristata, subæqualibus.

C. setacea, *Dewey car.* l. c. ix. p. 61. t. 2. f. 5. mala.

Culm 18—30 inches high, acutely triangular, very scabrous above, furrowed and striate on the sides, leafy. *Leaves* linear, 3 lines broad, canaliculate, striate, nearly as long as the culm; exterior ones shorter; *sheaths* smooth, striate, white and membranaceous on the side of the stipule; *stipule* ovate, acute. *Spike* decompound, 2 inches long; often dioecious or polygamous) *spikelets* numerous, aggregated into several approximate spikes, ovate-cylindric, obtuse, becoming tawny, all bracteate. *Bractea* rather long and narrow, scabrous under the spikelets, and giving to the whole spike a bristly appearance. *Glumes* tawny, green on the keel, with the awn about the length of the fruit. *Fruit* slightly plano-convex, often indistinctly 3—5 nerved, scabrous on the margin, growing yellow, rather loose and somewhat diverging.

HAB. In wet upland pastures, with *C. multiflora* and *C. stipata*; Massachusetts. Dewey. Flowers in June and July, ripens its fruit in August.

Obs. This species is adopted from Professor Dewey's Caricography, it not having come under our observation. It is said to be intermediate between the two species just mentioned; its culm and leaves much resembling the latter, as well as its fruit, except that it is much more compressed; and approaching the former in its decompound spike and aggregation of spikelets. Its fruit, moreover, is described as less ovate, longer and more compressed than in *C. multiflora*.

23. *CAREX paniculata*, Lin.

C. spica decomposita, paniculata, interrupta; ramis alternis, remotiusculis; fructibus ovatis, acuminatis, patentibus, superne marginatis, serrulatis, bifidis.

C. paniculata, Willd. *sp. pl.* iv. p. 244. Pursh *fl.* i. p. 36. Muhl. *gram.* p. 224.

HAB. In wet meadows, Sussex county, New-Jersey. Massachusetts. Dewey.

Obs. This being an European species, no detailed description is given. Our specimens agree with those in our herbarium from Sweden, Germany, and England, except that the panicle is not so decompound in the North American plant.

C. decomposita of Muhlenberg, (*gram.* p. 264.) seems to be (by a specimen received from him, and by his herbarium) very near *C. paniculata* of Europe.

14. *CAREX teretiuscula*, Goodenough.

C. spica decomposita, vel paniculata, densa, subacuta (saepe dioica, demum brunnea); spiculis brevi-bracteatis; fructibus ovatis, acuminatis, basi subgibbosis, bidentatis, marginalibus ciliato-serrulatis.

C. teretiuscula, Willd. *sp. pl.* iv. p. 244. *Schk. car.* t. D. f. 19. & t. f. 69. *Dewey car.* l. c. vii. p. 225

C. paniculata β., *Wahlenberg*.

HAB. In marshes and bog meadows; common in New-England. Flowers in the end of May.

OBS. This species is also a native of Europe, and is considered by *Wahlenberg* as a variety of *C. paniculata*. The spike, however, is far less compound, and the fruit and scales become brownish black in age.

2. *Three Stigmas*.

25. *CAREX pedunculata*, *Muhlenberg*.

C. spicis subquaternis, longe-pedunculatis, remotissimis; fructibus obovatis, triquetris, obtusis, glabris, ore integris; glumis ovatis, mucronatis (purpureo-viridibus).

C. pedunculata, Willd. *sp. pl.* iv. p. 222. *Schk. car.* t. Ggg. f. 131. opt. *Pursh fl.* i. p. 39. *Muhl. gram.* p. 232.

Culm triquetrous, filiform, purplish at the base, about six inches high, producing one longer and one shorter peduncle, at the base of which there is a lacerate elongated sheath or bractea; each peduncle terminated by a single spikelet. Besides these there are a number of radical peduncles or scapes proceeding from the root, rather shorter than the others. **Leaves** all radical, much longer than the culm, spreading and usually resting on the ground, flattened, but with the midrib prominent below, abruptly acute, nerved, very dark green, scabrous on the margin, tinged with purple at the base. **Spikes** subtriangular, 3—5 on one plant. **Glumes** ovate or lanceolate, obtuse, mucronate, purplish and green. **Fruit** subpedicellate, smooth, and without a rostrum; orifice entire. **Stigmas** rarely 2.

HAB. On rocky hill sides; Canada to Pennsylvania. Flowers about the beginning of May.

26. *CAREX ovata*, *Rudge*.

C. spicis subquinis, pedunculatis, ovatis, pendulis; fructibus obovatis, utrinque acutis, glumis ovatis, acutis, fructu aequantibus.

C. ovata, *Rudge Lin. Trans.* viii. p. 96. t. g. f. i. *Pursh fl.* i. p. 39. *Rees's Cyclop.* No. 69.

Culm acute, triangular, angles acute, scabrous. *Leaves* erect, slender, scabrous on the margin. *Spikes* 4—5, pedunculate; florets densely imbricated. *Glumes* brown, as long as the fruit. *Bractea* at the base of the peduncles subamplexicaul. *Fruit* ovate, compressed, acuminate, cleft at the tip. *Rudge.*

HAB. In Newfoundland. *Rudge.*

OBS. Of this species we have seen no specimens.

C. Summit pistilliferous.

1. *Two stigmas.*

27. *CAREX bicolor*, Allioni.

C. spicis subquaternis, pedunculatis, terminalibus, erectis; fructibus obovatis, obtusis; glumis ovatis, obtusis, (nigrescentibus.)

C. bicolor, *All. fl. pedem.* No. 2311. *Willd. sp. pl.* iv. p. 222. *Schk. car.* t. Aaaa. f. 181.

HAB. In Labrador. About 6 inches high.

OBS. My specimens which were collected by a Moravian missionary, agree perfectly with Schkuhr's figure and description, except that they are rather taller than the European plant is represented.

28. *CAREX Deweyana*.*

C. spiculis subternis, sessilibus, laxis, duabus approximatis, tertia distante, longe-bracteatis (excepta suprema); fructibus oblongo-lanceolatis, subcompressis, longiuscule rostratis, bifidis, glabris, rostro serrato-ciliato; culmo flaccido.

C. Deweyana, *Schw. an. tab. car.* l. c. *Dewey l. c.* ix. p. 62. t. 3. f. 21.

Culm 1—4 feet high, weak, slender and subprocumbent, triquetrous, with the angles almost winged above and scabrous, leafy below. Small separate filiform culms, not exceeding 2—3 inches in length, are intermixed among the tuft of leaves with the rest, and otherwise resemble them.

Leaves mostly radical, narrow, flat, thin and smooth, shorter than the culm; *sheaths* smooth, white on the side of the *stipule*. *Spikelets* usually 3, sometimes 2 or 4, loose, 3—5-flowered; the two upper ones approximate, the lowest distant about an inch from these, the culm between them somewhat flexuous, all bracteate except the highest; *bractea* subulate, the lowest longer than the culm, broad at the base. *Glumes* oblong-lanceolate, white and scarious, with a green keel, awned a little, shorter than the fruit. *Fruit* acuminate, beaked, subterete at the base.

HAB. In moist rocky woods. Williamstown and elsewhere. Dewey. Plainfield, Massachusetts Dr. Porter. Norwich, Vermont. Barratt. Flowers in June.

OBS. Fertile glumes a little variable in length and breadth. The whole plant is of a yellowish green color.

29. *CAREX loliacea*, Lin.

C. spiculis subquaternis, subdistantibus paucifloris; fructibus ellipticis, obtusis, nervosis, compressis, erectis.

C. loliacea, Willd. *sp. pl.* iv. p. 237. Schk. *car.* t. Pp. f. 204. (*C. tenella*) Wahl. *act. holm.* 1803. p. 147. Richardson *app. Frank. nar.* ed. 2. p. 35. No. 372.

HAB. In the woody country of Arctic America. Dr. Richardson.

OBS. It is very probable that this species will be found in the mountainous parts of New-England. We have specimens from the cedar swamp in New-Durham, New-Jersey, which exactly resemble Schkuhr's figure.

30. *CAREX trisperma*, Dewey.

C. spiculis ternis, remotis, alternis, sessilibus, ovatis, supremis ebracteata; fructibus oblongis, acutis, (vel brevi-rostratis) ore integerrimis, multinervosis, apice subscabris, subdivergentibus, gluma oblonga acuta hyalina longioribus.

C. trisperma, Dewey *car.* l. c. ix. p. 63. t. 3. f. 12.

Culm 18 inches to 2 feet high, slender, prostrate, filiform, triquetrous, remarkably smooth, leafy below. *Leaves* very narrow, linear, shorter than the culm; *sheaths* striate, smooth. *Spikelets* 3, with about two sterile

florets in the inferior part of each, ovate, remote, (often an inch apart) mostly 3-flowered, but sometimes with 2 or 4 fertile florets; the 2 lower spikelets supported by filiform scabrous bractes surpassing the culm in length. *Glumes* (of the fruit) ovate or oblong, acute, white and hyaline, with a green keel, about two-thirds as long as the fruit. *Fruit* oblong, convex above, plane below, with numerous indistinct nerves, and a small abrupt acumination, entire at the orifice.

HAB. In sphagnous bogs, usually on mountains. *Williamstown* and *Deerfield*, Massachusetts. *Dewey*. In wet places on the summit of the *White Mountains*, *New Hampshire*. *Dr. Barratt*. Flowers in June.

OBS. 1. The color of the whole plant is pale green. 2. This species is nearly allied to the preceding, but differs essentially in the glume and fruit. From *C. disperma* it differs in the position of the sterile florets, &c.

31. *CAREX arida**. t. XXIV. f. 2.

C. spiculis (magnis) octonis, subapproximatis, terminalibus, siccis; fructibus ellipticis compressis, alatis, medio teretibus, utrinque acuminatis, apice apertis, bifidis; culmo foliato.
C. muskingumensis, *Schw. an. tab. car. l. c.*

Culm 2—3 feet high, triquetous, furrowed, scabrous above, smoother below, clothed with leaves at remarkably regular intervals, to about half its height; the inferior sheaths purplish at the base. *Leaves* 4 lines or more broad, very long, carinate, but flattened, attenuate to a point, dark green, extremely rough on the margin; *sheaths* white and membranaceous on the inner side. *Spikelets* very large, terminal, 3—9 in number, long-elliptical and acuminate both ways, of a peculiarly dry and chaffy appearance, each almost half an inch long, approximate but not crowded, a little diverging from the common rachis. *Glumes* ovate-lanceolate, dry and cartilaginous, shorter and narrower than the fruit, closely imbricate, and lacerately ciliate. The lowest sterile glume in each spikelet more or less mucronate and sheathing at the base; in the lowest spikelet it is elongated and appressed. *Fruit* proportionably small and thin, compressed, compactly imbricate, elliptical, attenuate at each end, closely rounded about the contained seed, very broadly winged; the winged margin finely serrate towards the summit, which is divergingly bifid.

HAB. In wet meadow margins, in Tuscarora county, Ohio, near Muskingum river, in very considerable quantity. Flowers in June.

Obs. This species probably inhabits the western States generally. The dry scabrous whitish gray appearance of the spikes forms a contrast with its dark green leaves and culm. The name given in the Analytical Table (l. c.) has been changed at the suggestion of a botanical friend.

CAREX lagopodioides, Schkuhr.

C. spiculis subduodenis, (10—16) ellipticis, confertis bractea sub-infima culmo superante; fructibus lanceolatis, acuminate, erectis, bicuspidatis, angusto-marginatis, margine ciliato-serrulatis, gluma ovato-lanceolata duplo longioribus.

C. lagopodioides, Willd. *sp. pl.* iv. p. 230. *Schk. car.* t. Yyy. f. 177. (opt.) *Pursh fl.* i. p. 37. *Muhl. gram.* p. 226. *Dewey car.* l. c. viii. p. 95. *Elliott sk.* ii. p. 523.

C. tribuloides, Wahl. (secund *Muhl.*)

C. Richardi, Mich. *fl.* ii. p. 170.

Culm erect 1—2 feet (sometimes more) in height, triangular, scabrous above, leafy to half its height, much furrowed. *Leaves* longer than the culm, erect, pale green, 2—3 lines broad. *Spikelets* usually about 12, sometimes fewer and occasionally as many as 20, sessile, ovate, of an elongated form when young, and appearing subcylindrical; under the lowest is usually a very long foliaceous bractea. *Glumes* lanceolate, carinate, not mucronate, a little more than half the length of the fruit. *Fruit* long-lanceolate, erect, bifid nerved, slightly margined.

HAB. In the borders of ponds; not common. Flowers in May.

Obs. The whole plant is of a pale green color.

33. *CAREX scoparia*, Schkuhr.

C. spiculis subquinis (5—7) ovatis, sessilibus, approximatis aggregatis, infima bracteata, bractea decidua; fructibus

ovato-lanceolatis, marginatis, nervosis, glabris, bicuspidatis, glumis lanceolatis, acuminatis, longioribus.

C. scoparia, Willd. *sp. pl.* iv. p. 230. *Schk. car.* t. Xxx. f. 175. (opt.) *Pursh fl.* i. p. 37. excl. syn. *Muhl. gram.* p. 227. *Dewey car.* l. c. viii. p. 94. *Elliott sk.* ii. p. 535.

C. leporina, Mich. *fl.* ii. 170.

Culm 1—2 feet high, triquetrous, scabrous above, leafy only below, longer than the leaves. *Leaves* long and narrow. *Spikelets* 5—8 (sometimes 10) ovate, when mature obtuse, approximate at the extremity of the culm, which is usually a little nodding, the two lowest are furnished with short deciduous bracts at the base. *Glumes* lanceolate, acuminate, carinate, brownish, with a green midrib. *Fruit* tawny when mature, ovate-lanceolate, with a long acumination, distinctly margined but not winged, about 9 nerved.

HAB. In wet meadows and swamps: common. Flowers in May.

OBS. Allied to *C. straminea*, but differs in its fruit, being much narrower and not winged. It is remarkable for the pale reddish brown appearance of its spikes when in fruit. It is very distinct from *C. ovalis* or *C. leporina*.

34. *CAREX straminea*, Willdenow.

C. spiculis subquinis (4—7) subrotundis, approximatis, brevibracteatis; fructibus subrotundo-ovatis, rostratis, compressis, lato-alatis, bidentatis, ciliato-serratis, gluma lanceolata longioribus.

C. straminea, Willd. *sp. pl.* iv. p. 242. *Wahl. act. holm.* 1803. p. 145. *Schk. car.* t. Xxx. f. 147. *Muhl. gram.* p. 229. *Dewey car.* l. c. vii. p. 276.

Culm about 8—12 inches or more in height, straight and erect, leafy, triquetrous, slightly scabrous. *Leaves* linear, erect, shorter than the culm; inferior ones abbreviate. *Spikelets* usually about 5, sometimes 4 and even 3, closely approximate at the summit of the culm, the base of each furnished with a broad ovate bractea, which is brownish green, ribbed, and in the lowest about the length of the spikelet. *Glumes* slightly mucronate. *Fruit* very broad, ovate, abruptly acuminate, the margin

dilated into wings on each side, considerably divergent when ripe. *Seed* suborbicular, compressed punctate, much smaller than its envelope.

HAB. In wet meadows and swamps, not so common as the preceding species. Flowers in May.

Obs. This species, which has been so often confounded with the preceding, is easily distinguished from it, by attending to the diagnostic character we have given; particularly its broad-winged fruit. The spikelets are nearly globose, and of a yellowish color when mature.

35. *CAREX fœnea*, Muhlenberg.

C. spiculis pluribus (8-10,) compositis, inferioribus distinctis, superioribus confluentibus; fructibus ovatis, acuminatis, alatis, bidentatis, glumis ovatis paulo longioribus.

C. fœnea, Muhl. gram. p. 227. Elliott sk. ii. p. 533.

Culm about 2 feet high, obtusely triangular, scabrous near the summit, unusually thick, furrowed, leafy to the middle. *Leaves* 3-4 lines broad, scabrous on the margin, shorter than the culm. *Spikes* numerous subglobose; the lower always (and sometimes the others,) disposed in fascicles of 3-4-5 spikelets; upper ones alternate and approximate; at the base of the lowest fascicle, which is somewhat remote from the rest, is a long foliaceous bractea, diverging almost horizontally. *Glumes* lanceolate, not pointed, ribbed, membranaceous, lacerately ciliate on the margin, shorter than the fruit. *Fruit* ovate-lanceolate, distinctly winged, strongly ciliate on the margin; apex bifid, but not opening.

HAB. Marshy grounds near Germanton, Stokes County, North-Carolina. In Pennsylvania, *Muhlenberg*. Flowers late in the season.

Obs. This species is nearly related to *C. lagopodioides*.

36. *CAREX cristata** t. xxv. fig. 1.

C. spiculis pluribus, (8-15) in pseudo-capitulum aggregatis; fructibus ovato-lanceolatis, alatis, divergentibus, margine grosse serratis.

Culm 2 feet or more in height, triquetrous and very scabrous above, leafy chiefly below the middle, much furrowed. *Leaves* several lines in breadth, scabrous on the margin, shorter than the culm. *Spikes* 8 to 12, (sometimes more) crowded into an ovate head, so that the form of each cannot be distinguished when ripe; the pseudo-capitulum exhibiting a cristate appearance. At the base of the spikelets are short subulate bractæ. *Glumes* ovate-lanceolate, brown, shorter than the fruit. *Fruit* acuminate, distinctly winged, strongly serrato-ciliate, divergingly bifid, regularly and distantly striate, diverging, but not horizontal.

HAB. In wet bushy places, Massachusetts to Pennsylvania; not uncommon. Flowers in the beginning of June.

OBS. This species is nearly related to *C. straminea*, with which it is confounded in Muhlenberg's herbarium. It is easily distinguished by its compact head of spikelets and diverging fruit. Sometimes it occurs four feet in height.

37. *CAREX festucacea*, Schkuhr.

C. spiculis obovatis, (5-8) sub-approximatis, bracteatis; fructibus subrotundo-ovatis, rostratis, bidentatis, alatis, margine ciliato-serratis, gluma ovato-lanceolata longioribus.

C. festucacea, Willd. *sp. pl.* iv. 242. *Schk. car.* t. Mmm. f. 173. *Pursh fl.* i. p. 38. *Muhl. gram.* p. 249. *Dewey car.* l. c. viii. p. 96. *Elliott sk.* ii. p. 537.

Culm about two and a half feet high, triangular, leafy, sometimes decumbent, curved at the summit when the fruit is ripe. *Leaves* narrow, spreading, shorter than the culm. *Spikelets* usually about 6, but occasionally 9 or even 12, sometimes rather distant, at first cylindrical-oblong, but at length obovate, or somewhat clavate, the base being contracted and composed of closely appressed sterile glumes; when fully ripe they are nearly globose. *Glumes* whitish, acute, shorter than the fruit, with a narrow green keel. *Fruit* broadly ovate, plano-convex, acuminate into a short beak; margin distinctly, but not broadly winged, ciliato-serrulate.

HAB. In meadows and in dry rocky woods, common throughout the United States. Flowers in May.

Obs. This species is nearly allied to *C. scoparia*, and to *C. straminea*, especially to the latter. From the former it is distinguished by its less acute and more distant spikes, and its broader fruit, which, moreover, never becomes tawny, as in *C. scoparia*.

C. straminea differs strikingly in its very broad-winged fruit. When growing in woods the spikes are silvery white, but in meadows of a pale greenish color.

38. *CAREX stellulata*, Goodenough.

C. spiculis 3-4, remotiusculis, superiori basi attenuata, cæteris ovatis; fructibus plano-convexis, patentibus, dein reflexis, ovatis breviacuminatis, margine scabris.

C. stellulata, Willd. *sp. pl.* iv. p. 236. *Schk. car.* t. C. f. 14.

Culm 8-18 inches high, slender. *Leaves* longer than the culm, chiefly radical. *Spikelets* mostly 4, the lowest sometimes furnished with a long foliaceous bractea, the upper one much attenuated by the sterile glumes: the rest cylindrical-oblong when young, but at length ovate or roundish. *Glumes* ovate, rather obtuse, two-thirds the length of the fruit, green. *Fruit* broad-ovate, when fully ripe almost cordate at the base, with a short abrupt acumination; margin distinct, but not winged; apex nearly entire.

HAB. Wet places, especially along woods. New-York to Carolina. Flowers in May.

Obs. The North American plant appears to be altogether identical with the European.

39. *CAREX scirpoides*, Schkuhr.

C. spiculis quaternis, ovatis, obtusis, approximatis, suprema clavata; fructibus ovatis, bidentatis, plano-convexis, erecto-patulis (nec reflexis,) bidentatis, basi subcordatis, margine ciliato-serrulatis, gluma ovata obtusa longioribus.

C. scirpoides, Willd. *sp. pl.* iv. p. 237. *Schk. car.* t. Zzz. f. 180. *Pursh fl.* i. p. 37. *Muhl. gram.* p. 225. *Dewey car.* l. c. viii. p. 96. *Elliott sk.* ii. p. 532.

C. triceps, Mich. *fl.* ii. p. 170.

Culm 6-12 inches high, triquetrous and subscabrous above, rather terete below, strictly erect, leafy only at the base. *Leaves* very narrow, erect, shorter than the culm, pale green. *Spikes* mostly 4, sometimes 3 or 5; at first cylindrical-oblong, but ovate when mature; the uppermost one furnished with numerous sterile scales at the base, which give it a club-shaped appearance; the lower often with a long bractea at the base. *Glumes* lanceolate, rather obtuse. *Fruit* broad-ovate, erect or spreading horizontally, subcordate, nerved, slightly bifid, scabrous on the margin.

HAB. In wet meadows and woods; common. Flowers in May.

Obs. This species is nearly allied to the preceding, and perhaps is scarcely distinct. It is usually smaller in all its parts, and the fruit only spreading; not reflexed. But it must be confessed, that these characters are by no means constant.

40. *CAREX curta*, Goodenough.

C. spiculis subsenis, subremotis, subcylindrico-ovatis; tumidis, sessilibus; fructibus brevi-ovatis, plano-convexis, acutiusculis, ore integris, erectis.

C. curta, Willd. *sp. pl.* iv. p. 241. Schk. *car.* t. C. f. 13. Pursh *fl.* i. p. 37. Muhl. *gram.* p. 232. Dewey *car.* l. c. viii. p. 93.

C. canescens, L. Wahl. *act. holm.* 1803. p. 148.

Culm about 2 feet high, nodding at the summit when the spikes are mature, leafy, triquetrous. *Leaves* narrow, about as long as the culm. *Spikelets* 5-6, the two or three uppermost ones closely approximate, the rest half an inch or more distant, when young sub-cylindric, but at length obovate, the lowest furnished at the base with a short setaceous bractea. *Glumes* ovate, whitish, acute, with a green keel, rather shorter than the fruit. *Fruit* ovate, with a very short point, very convex on the exterior side, slightly margined: orifice appearing minutely bidentate under the lens.

HAB. In wet grassy places; common. Canada to New-York. Flowers in the middle of May.

Oss. The spikes, when mature, are usually of a greenish colour ; sometimes they are silvery white, in which state the plant appears to be *C. canescens* of Linnæus and Smith.

41. *CAREX tenera*, Dewey.

C. spicis subquinis, obovatis, remotiusculis, sessilibus, inferne attenuatis, infima bracteata ; fructibus ovatis, compressis, rostratis, subulatis, nervosis, ciliato-serratis, gluma oblongo-lanceolata majoribus.

C. tenera, Dewey car. l. c. viii. p. 97. & ix. t. 3. f. 9. mala.

Culm 15-30 inches high, slender, somewhat five-sided, leafy towards the base, with a slender flexuous rachis. *Leaves* much shorter than the culm. *Spikelets* 3-5, somewhat clavate and lengthened below, of a brownish colour, distant from each other about their length ; the whole nodding. *Fertile glumes* about two-thirds the length of the fruit, and tawney. *Dewey.*

HAB. In moist meadows ; Massachusetts. Flowers in May.

Oss. This species is adopted from Professor Dewey's Caricography. We have no specimens of it from its discoverer, but a *Carex* agreeing in almost every respect with the above description, is rather common in the Highlands of New-York. According to Professor Dewey, it resembles *C. scoparia*, but differs essentially in the form of its fruit.

42. *CAREX remota*, Lin.

C. spiculis alternis, remotis ; bracteis foliaceis, longissimis, suffultis ; fructibus ovatis, acuminatis, bifidis, compressiusculis.

C. remota, Willd. sp. pl. iv. p. 239. Schk. car. t. E. f. 23. Richard. app. Frank. nar. ed. 2. p. 35.

HAB. In the woody region of Arctic America. *Dr. Richardson.*

Oss. We have seen no American specimens of this *Carex*.

2. Three stigmas.

43. *CAREX atrata*, Lin.

C. spicis androgynis, ternis, pedunculatis, confertis, fructiferis subpendulis, (nigris;) fructibus subrotundo-ovatis, breviter rostratis, bidentatis.

C. atrata, *L. Willd. sp. pl.* iv. p. 221. *Schk. car.* X. f. 77.

HAB. On the Rocky Mountains, near the snowy region. *Dr. James.* On the White Hills of New-Hampshire. *Nuttall.*

OBS. This species is also a native of the north of Europe. Our American specimens, which were collected by *Dr. James*, in Long's Expedition, agree exactly with *C. atrata* from Sweden.

44. *CAREX media*, *R. Brown.*

C. spicis androgynis, ternis, brevissime pedunculatis, sessilibusve, approximatis; fructibus ovatis, rostellatis, glaberrimis, gluma ovata obtusiuscula longioribus.

C. media, *R. Brown in Richard. app. Frank. nar.* ed. 2. p. 35.

HAB. In the woody region of Arctic America. *Dr. Richardson.*

OBS. Allied to *C. bicolor.* *R. Brown.*

††. *Terminal spike androgynous, the rest pistilliferous; stigmas 3.*

45. *CAREX viridula*, Michaux.

C. spicula terminali, androgyna, inferne mascula, ovata, brevi, crassa, cæteris (2) fructiferis, arctes sessilibus, brevibus, crassiusculis; fructibus glabris, ovato-triquetris, valde nervosis, muticis; glumis lanceolatis, mucronatis, fructu longioribus.

C. viridula, *Mich. fl.* ii. p. 170.

C. triceps, *Elliott sk.* ii. p. 538.

Culm about 8 inches high, erect, of a rigid habit, triquetrous, scabrous above, leafy and tinged with purple below. *Leaves* erect, canaliculate, longer than the culm, scabrous, much furrowed, hispid below; outer ones abbreviate. *Spikes* 3, clustered; terminal one androgynous, sterile at the base, which is abruptly attenuate downward; upper part thick: lowest spike with a long leafy bractea at the base. *Glumes* projecting beyond the fruit, lanceolate, mucronate. *Fruit* subovate, obtusely triangular, not pubescent, with prominent whitish veins, green, rather obtuse.

HAB. Along the roads, in the pine forests of North Carolina, near Greensborough, Guildford County. June.

Obs. Grows in patches. This species is intermediate between *C. hirsuta* and *virescens*. Perhaps it is but a variety of the former.

46. *CAREX virescens*, Muhlenberg.

C. spiculis ternis, oblongis, erectis; suprema pedunculata. inferne staminifera; cæteris fructiferis, subsessilibus, bracteatis; fructibus ovatis, obtusis, costatis, pubescentibus.

C. virescens, Willd. *sp. pl.* iv. p. 251. *Schk. car.* t. Mmm. f. 147. *Pursh fl.* i. p. 39. *Muhl. gram.* p. 233. *Dewey car.* l. c. ix. p. 259.

Culm 12-24 inches high, erect, slender, triangular, leafy. *Leaves* narrow, erect, longer than the culm, scabrous on the margin, striate and considerably pubescent: *sheaths* villous, the exterior ones often purplish at the base. *Spikes* very generally 3, all approximate; the terminal one androgynous; the rest fertile, nearly sessile, bracteate at the base. The androgynous spike is linear below, cylindrical above. *Sterile glumes* ovate, acuminate, white and pale brown, subciliate at the apex; *fertile glumes* ovate, mucronate, whitish, the carina scabrous and projecting, shorter than the fruit. *Fruit* ovate, when fully ripe obtuse, or with an obscure point, compressed on the inner side, turgid on the outer, distinctly nerved, strigosely pubescent, generally longer, but sometimes a little shorter than the glume.

HAB. In dry woods and on hill sides; rarely in wet situations. Canada to North Carolina. Flowers about the end of May.

OBS. The leaves are sometimes almost smooth. Color of the whole plant dull green.

β. costata : spiculis majoribus, fructibus valde costatis, vaginis exterioribus atropurpureis.

C. virescens β. costata, *Dewey car.* l. c.

C. costata, *Schw. anal. tab. car.* l. c.

HAB. On rocky hills. Flowers in the beginning of June.

OBS. This variety is pretty constantly much taller, and larger in all its parts than the ordinary *C. virescens* ; it does not, however, on re-examination, appear to be a distinct species.

47. *CAREX hirsuta*, Willdenow.

C. spicis ternis, ovato-oblongis, erectis, summa brevipedunculata, cæteris ovatis, subsessilibus, bracteatis, omnibus approximatis, densifloris; fructibus subrotundo-ovatis, nervosis, obtusis, ore integris, glabris, gluma ovata acuminata longioribus; foliis vaginisque pubescentibus.

C. hirsuta, *Willd. sp. pl.* iv. p. 252. *Schk. car.* t. *Www.* f. 172 *Pursh fl.* i. p. 40. *Dewey car.* l. c. ix. p. 260. *Elliott sk.* i. p. 538.

Culm 12—13 inches high, erect, triquetrous, scabrous, leafy. *Leaves* about a line and a half broad, longer than the culm, generally as well as the sheaths, strigosely pubescent, but sometimes nearly smooth; exterior ones purplish at the base. *Spikes* 3, very rarely 4: terminal one attenuate at the base by the decurrent sterile glumes, thus giving it a slender

β. *pedunculata*: spiculis oblongo-cylindricis, pedunculatis; foliis vix pubescentibus.

HAB. In meadows, growing with *C. digitalis* and the ordinary variety of *C. hirsuta*. Philipstown, Highlands of New-York; rare. Dr. Barratt.

OBS. This plant might be taken for a distinct species, were it not carefully examined in a living state. Its spikelets are three fourths of an inch long, slender, and supported by peduncles half an inch in length. The leaves are only slightly pubescent under a high magnifier.

48. *CAREX Buxbaumii*, Wahlenberg.

C. spiculis subquaternis, obovatis, subremotis, suprema androgyna, pedunculata, cæteris fertilibus, sessilibus, longissime bracteatis; fructibus ovatis, obtusis, compressiusculis, ore subintegris, gluma ovata acuminata (fusca) brevioribus.

C. Buxbaumii, Willd. *sp. pl.* iv. p. 252. *Pursh fl.* i. p. 40. *Muhl. gram.* p. 325. *Elliott sk.* i. p. 539.

C. polygama, Schk. *car. t.* X. & Gg. f. 76.

CULM about two feet high, triquetrous, smoothish, leafy below. *Leaves* shorter than the culm, smooth. *Spikes* usually 4, rather remote, especially the lowest one, which is furnished with a foliaceous bractea overtopping the culm; the other spikes with shorter bractea, the uppermost androgynous, sterile at the base, rarely entirely sterile. *Glumes* ovate, cuspidate, dark brown, as well as the base of the bractea; keel green, longer than the fruit. *Fruit* smooth, pale green, obscurely nerved.

HAB. In sphagnous swamps. Litchfield, Connecticut. Mr. Brace. Near New-Haven. Mr. Leavenworth. Plainfield, Massachusetts. Dr. Porter. In Pennsylvania. Muhlenberg. Flowers in June.

OBS. Our plant appears to differ in no respect from the European *C. Buxbaumii*, of which we have good Swedish and German specimens.

49. *CAREX digitalis*, Muhlenberg. t. xxvi. f. 1.

C. spicis subquaternis, distantibus, gracilis, pedunculatis, sublaxifloris, cernuis, suprema androgyna apice fructifera, cæteris omnibus fertilibus; fructibus oblongis, subtriquetris, obtusis, glabris, gluma oblonga mucronata longioribus.

C. digitalis, Willd. *sp. pl.* iv. p. 298. *Pursh fl.* i. p. 44.

Muhl. gram. p. 255. *Elliott sk.* ii. p. 551.

C. gracillima, Schw. *an. tab. car.* l. c. *Dewey car.* viii. p. 98.

Culm a foot and a half high, slender, but erect, (rarely declining) growing separately or in clusters, subtriangular, leafy below, scabrous above, deeply striate. *Leaves* about two lines broad, shorter than the culm; lower ones abbreviate, with the sheaths purplish at the base. *Spikes* very generally 4, linear and filiform, an inch and a half or more in length; terminal one on a filiform peduncle, the upper fourth part fertile, or sometimes entirely sterile: fertile spikes 15—20-flowered; florets rather distinctly imbricate. *Glumes* of the sterile florets closely imbricate, ovate-lanceolate, acute, white with the keel green; of the fertile florets ovate, ending in an abrupt point or short bristle, about half as long as the fruit. *Fruit* when mature subovate, very obtuse, with a minute oblique orifice, slightly nerved.

HAB. In wet meadows, particularly in mountainous districts; New-England to Pennsylvania; common. **Flowers** in May.

OBS. The whole plant is smooth and pale green. The terminal spike very commonly bears a few fertile florets at the extremity, which is a circumstance not noticed by Willdenow or Muhlenberg, and induced us to consider this plant a distinct species, especially as we have a *Carex* from Cherokee, which more exactly agrees with Willdenow's description; but as his plant was a native of Pennsylvania, and does not differ essentially, by the description, from ours, we suppose they are identical.

50. *CAREX fuliginosa*, Schkuhr.

C. spicis exsertis, subquaternis, distantibus, terminali androgyna, cernuis; fructibus oblongis, mucronatis, apice bifidis, gluma longioribus.

C. fuliginosa, *Schk. car. pars. i. p. 91. & ii. p. 47. t. Cc. f. 47. Rich. app. Frank. nar. ed. 2. p. 35.*

HAB. In the woody region of Arctic America. *Dr. Richardson.*

51. *CAREX misandra*, R. Brown.

C. spicis (3—4) ovalibus, pedunculatis, pendulis, alternis, vel raro subumbellatis, terminali basi sterili (rarius tota sterili); fructibus lanceolatis, acuminatis, bidentatis, margine denticulatis, gluma ovali longioribus.

C. misandra, *R. Brown app. Parry's 1st Voyage. p. clxxxiii.*

Culm 6—9 inches high. *Leaves* linear, attenuate at the apex, scabrous on the margin. *Spikes* 3—4; the terminal one sterile at the base, rarely entirely sterile; the rest oval or oblong, pendulous. *Glumes* oval, rather obtuse, smooth, dark brown. *Fruit* nearly black, except the orifice, which is white, the upper part of the margin denticulate, the rest smooth. *Stigmas* 2—3 (very often 3.)

HAB. Melville Island. *R. Brown.*

Obs. Nearly allied to *C. fuliginosa*, Stern. and Hoppe, in

• **Act. Soc. bot. Ratisb. i. p. 159. t. 3. and perhaps not distinct from that plant. R. Brown.**

52. *CAREX formosa*, Dewey.

C. spicis quaternis, oblongis, crassis, distantibus, exserte pedunculatis, nutantibus, suprema inferne sterili; fructibus oblongis, triquetris, subinflatis, utrinque acutiusculis, ore subintegro vel bilobo, obsolete nervosis, gluma ovata acuta duplo longioribus.

C. formosa, *Dewey car. l. c. viii. n. 98. & ix t. 2. f. 6.*

Culm 12—18 inches high, triangular, leafy. *Leaves* about as long as the culm, smooth or slightly pubescent, 2 lines broad, the exterior sheaths purple at the base. *Spikes* 4, oblong, supported by filiform peduncles an inch or more in length; terminal one androgynous, the inferior two thirds sterile and slender. *Glumes* ovate, acute, mucronate, green with a white margin, about half as long as the fruit. *Fruit* distinctly triquetrous, acute, a little tapering at the base, smooth, obscurely nerved, yellowish when mature, orifice minute, entire or slightly bidentate.

HAB. In wet upland meadows. Stockbridge, Massachusetts, &c. *Prof. Dewey.*

Obs. Colour of the whole plant yellowish green. This species is allied to *C. digitalis*, but differs in its acute fruit, shorter and ovate spikes, &c.

53. *CAREX Davisii*.*

C. spicis quaternis, filiformibus, pedunculatis, subcernuis, suprema inferne sterili; fructibus oblongis, triquetris, utrinque acutis, subbilobis, gluma oblonga aristata brevioribus; foliis vaginisque pubescentibus.

C. aristata, *Dewey* l. c. vii. p. 277. & ix. t. 1. f. i.

C. (anon.) No. 45. *Muhl. gram.* p. 254.

Culm about a foot and a half high, leafy. *Leaves* longer than the culm, slightly pubescent; sheaths pubescent. *Spikes* 4, filiform, with the rachis flexuous, on filiform peduncles, which are only slightly sheathed at the base, varying from an inch to an inch and a half in length; florets rather loosely imbricate. *Glumes* of the sterile florets lanceolate, hyaline, with a green keel: of the fertile oblong-lanceolate, hyaline, acuminate and terminating in an awn which projects beyond the fruit: keel green. *Fruit* smooth, with a membranaceous orifice which is obscurely 2-lobed.

HAB. Williamstown, Massachusetts. *Prof. Dewey.* In New-Jersey and Cherokee. *Muhlenberg.*

Obs. The specimens in Muhlenberg's herbarium, labelled No. 373, were examined by Dr. Torrey, and found to be precisely the same with the *C. aristata* of Prof. Dewey.

The uppermost spike is occasionally found entirely sterile. The name of this species has been changed, as there is a *C. aristata* previously established by R. Brown.

††† *Staminiferous and pistilliferous spikes distinct.*

* *Staminiferous spike solitary.*

a. *Two stigmas.*

54. *CAREX compacta*, R. BROWN

C. compacta, R. Brown's *app. Ross's voyage*, p. Richard.
app. Frank. nar. ed. 2. p. 35.

HAB. Barren grounds of Arctic America. Dr. Richardson.

OBS. Resembles *C. saxatilis*. R. Brown. We have seen no specimens of this *Carex*.

55. *CAREX concolor*, R. BROWN.

C. spicis fertilibus 2—3, erectis, subsessilibus; glumis omnibus obtusis, subconcoloribus, bracteis auriculatis; fructibus lævibus, ovalibus, mucronatis, integerrimis, culmis lævibus.

C. concolor, R. Brown. in *App. Parry's 1st voyage*.
p. clxxxiii. & cccviii.

HAB. In Melville Island.

OBS. Very near *C. cæspitosa*, R. Brown.

55. *CAREX mutica*, R. BROWN.

C. spica sterili glumis obtusis, fertilibus tribus, distantibus, subexserte pedunculatis, erectis, raris; fructibus ovalibus, muticis, lævibus, gluma ovata mucronata longioribus.

C. mutica R. Brown, in *Richard. app. Frank. nar. ed. 2.*
p. 35.

OBS. Leaves and bractæ flat.

HAB. In the woody region of Arctic America. Dr. Richardson.

57. *CAREX novæ angliaë*.*

C. spica sterili brevi-pedunculata; fructiferis 2—3, sessilibus, ovatis, paucifloris, subremotis; fructibus ovali-subtriangulis, rostratis, minute pubescentibus, gluma ovata mucronata paulo-longioribus; culmo gracili, subdecumbente.

C. novæ angliaë, *Dewey car.* l. c. ix. p. 64. t. 2. f. 7.

Culm 6—8 inches high, slender, leafy below, scabrous. *Leaves* very narrow, soft, smooth; sheaths purplish at the base. *Sterile spike* erect, a little obliquely pedunculate, from the same base with the upper fertile; *glumes* lanceolate, acuminate, carinate, brownish; *fertile spikes* usually about 3, closely sessile, mostly 4-flowered, the lowest considerably distant, and supported by a long foliaceous bractea; *glumes* ovate reddish brown, with a green keel. *Fruit* a little shorter than the glume, somewhat inflated, small, with a pretty long straight rostrum, subpubescent when young, nearly smooth when mature.

HAB. On Saddle mountain, Williamstown, Massachusetts, about 3000 feet above the sea.

OBS. This species somewhat resembles a depauperate variety of *C. varia*, or *marginata*, but it differs in having but two stigmas, subpubescent fruit, &c. Flowers in June. *Dewey*.

58. *CAREX aurea*, Nuttall. t. xxv. f. 2.

C. spicis fructiferis subternis, oblongis, laxifloris, subpendulis, subapproximatis, inferioribus pedunculatis; fructibus obovatis vel pyriformibus, obtusis, nervosis, ore integris, gluma ovata acuta longioribus.

C. aurea, *Nutt. gen.* ii. p. 205.

C. pyriformis, *Schw. anal. tab.* l. c. *Dewey car.* ix. p. 69.

Culm 4—10 inches high, triangular, subprocumbent, leafy below, slender, scabrous above. *Leaves* mostly radical, about as long as the culm, flat, smooth, a line and a half broad. *Sterile spike* on a short peduncle, often with a few fertile florets at the summit; *glumes* oblong, obtuse, brown, with a whitish margin. *Fertile spike* usually 3, florets loose and of length rather distant with the rachis, flexuous; upper one sessile, the others on exsert peduncles half an inch or more in length; *glumes* ovate.

acute, or obtuse, reddish brown *Fruit* pyriform or obovate, a little ventricose, strongly nerved, glaucous when young, orange-coloured when mature, orifice a little prominent.

HAB. In wet rocky situations. On the shores of Lake Michigan. *Nuttall*. Niagara Falls. *Mr. Cooper and Professor Dewey*. In various parts of Berkshire county, Massachusetts. *Dewey*. In the vicinity of Montreal, Lower Canada. *Dr. Holmes*. Flowers in May and June.

b. *Three Stigmas*.

1. *Pistilliferous spikes sessile, or with the peduncles inclosed*.

59. *CAREX varia*, Muhlenberg.

C. spicis fertilibus (2—3) subapproximatis, paucifloris, ovatis, subsessilibus, sterili sessili (vel brevi-pedunculata), fructibus subglobosis, acuminatis, bifidis, triquetris, hispidopubescentibus, glumis ovatis acuminatis æqualibus.

C. varia, *Willd. sp. pl.* iv. p. 259. *Schk. cur.* t. Uuu. f. 167. *Pursh fl.* i. p. 40. *Muhl. gram.* p. 236. *Elliott sk.* ii. p. 541.

Culm usually about a span high, sometimes a foot or more, erect, filiform, scabrous on the angles above. *Leaves* mostly radical, and shorter than the culm, narrow, smooth except on the margin; exterior sheaths purple at the base. *Sterile spike* usually either sessile, or on a very short peduncle, from the base of the uppermost fertile; *glumes* clasping, ovate, acuminate, brown, with a whitish margin, green on the keel; *Fertile spikes* mostly 3, erect, bracteate, ovate or oblong, few-flowered; *bractea* beneath the lowest one ovate, and brown; *glumes* ovate, acuminate, brown with a white keel. *Fruit* ovate and ventricose, so as to appear almost globose, acuminate, obtusely triangular, covered with a rough pubescence.

HAB. In dry rocky woods; Hudson's Bay to Georgia; common. Flowers early in April.

Obs. This species is allied to *C. pilulifera* of Europe. It also strongly resembles *C. marginata*.

60. *CAREX Richardsonii*, R. Brown.

C. spica sterili pedunculata ; fertilibus binis, alternis, subsessilibus, approximatis, exsertis, multifloris ; fructibus obtusis, pubescentibus ; culmo scaberrimo ; foliis rigidis.

C. Richardsonii, *R. Brown*, in *Richard. app. Frank.* ed. 2. p. 35.

Culm about 6 inches high, subterete, clothed with purplish-brown sheaths above the middle, deeply channelled and very scabrous to the base. *Leaves* growing in a dense tuft about the root, rigid, and apparently recurved, smooth ; those of the culm very short, with purple sheaths. *Sterile spikes* on a peduncle half an inch long, *glumes* ovate, rather obtuse, brown, with a white border. *Fertile spike* on short peduncles, which are included in large oblong brown bracts, with broad membranaceous borders ; *glumes* ovate, acute, brown. *Fruit* ovate, pubescent, with the orifice apparently entire.

HAB. In the woody region of Arctic America. *Dr. Richardson.*

OBS. Our specimens of this *Carex*, which we received from its discoverer, are not sufficiently mature for examining satisfactorily its fruit : it appears, however, to be a very distinct species.

61. *CAREX concinna*, R. Brown.

C. spica sterili sessili, cylindracea ; fertilibus ternis, subsessilibus, approximatis ; bracteis semimembranaceis ; fructibus trigono-obovatis, brevissime rostellatis, pubescentibus, glumis obovatis duplo fere longioribus.

C. concinna, *R. Brown*, l. c. p. 35.

Culm, about 4 inches high, filiform, leafy at the base, triquetrous, smooth. *Leaves* rigid, subradical, numerous, smooth, spreading. *Sterile spike* oblong, on a very short peduncle ; *glumes* broad-ovate, obtuse ; the lower ones slightly ciliate on the margin. *Fertile spikes* subsessile, 2-4-flowered, approximate ; *glumes* roundish-ovate, brown, about half the length of the fruit, obtuse. *Fruit* hispidly pubescent ; orifice bidentate.

HAB. In the woody region and barren grounds of Arctic America. *Dr. Richardson.*

Obs. Mr. Brown observes that this species is allied to *C. marginata*. In our specimens the spikes are much smaller, and the fruit almost hispidly pubescent. It has a very different appearance from the *C. marginata* as it generally occurs.

62. *CAREX vestita*, Willdenow.

C. spica sterili solitaria (vel geminatis, *suprema elongata*), pedunculata, cylindraceo-oblonga; fertilibus binis, ovato-oblongis, sessilibus, subapproximatis, apice interdum staminiferis; fructibus ovatis, subtriquetris, nervosis, brevirostratis, pubescentibus, gluma ovata submucronata paulo longioribus.

C. vestita, Willd. *sp. pl.* iv. p. 263. *Schk. car.* t. Bbbb. f. 182. *Pursh fl.* i. p. 41. *Muhl. gram.* p. 238. *Dewey car.* l. c. ix. p. 261. *Elliott sk.* ii. p. 542.

Culm about two feet high, triquetrous, scabrous on the margin, leafy below. *Leaves* shorter than the culm, 2 lines or more in breadth, scabrous, the lower ones abbreviate. *Sterile spike* solitary, but frequently geminate; the upper one on an elongated rigid peduncle, the lower closely sessile and shorter; *glumes* oblong, brown, white and membranaceous on the margin. *Fertile spikes* 2, (rarely 3) rather large, occasionally bearing a few sterile florets at the summit, with long foliaceous rigid bractæ: at the base; *glumes* ovate, mucronate, carinate, brown, with the keel green. *Fruit* somewhat triangular, pubescent; rostrum very short and bifid.

HAB. In wet sandy ground; Massachusetts to Georgia; rather rare. Flowers in the latter part of May and the beginning of June.

Obs. This species grows in tufts; according to Muhlenberg, it sometimes occurs with two stigmas.

63. *CAREX dasycarpa*, Muhlenberg.

C. spica sterili subsessili, parva: fertilibus subternis, subapproximatis, inferioribus brevi-pedunculatis; fructibus ovato-triquetris, villosa-hispidis, gluma acuminata longioribus.

C. dasycarpa, Muhl. *gram.* p. 236. *Elliott sk.* ii. p. 541. t. xii. f. 4.

Culm 12—18 inches high, triquetrous, glabrous. *Leaves* very narrow, linear, smooth, shorter than the culm; *sheaths* ciliate and lacerate on the margin. *Sterile spike* very small; *glumes* lanceolate. *Fertile spikes* generally 3, approximate, the upper sessile, the lower on short peduncles, supported by foliaceous bractæ overtopping the culm; *glumes* ovate, the inferior ones subnucronate. *Fruit* obtusely triquetrous, subovate, nerved, very villous, and somewhat hoary; orifice entire.

HAB. In old fields; Salem, North Carolina. In the upper country of South Carolina. *Elliott*. Flowers in April and May.

Obs. The specimens in Muhlenberg's herbarium, (No. 354.) resemble exactly the species represented by *Elliott*.

64. *CAREX marginata*, Muhlenberg.

C. spica sterili pedunculata; fertilibus subgeminis, approximatis, subglobosis, subsessilibus; fructibus globosis tomentosis, bidentatis, gluma oblongo-ovata longioribus.

C. marginata, Willd. *sp. pl.* iv. p. 261. *Schk. car.* t. Lll. f. 143. *Pursh fl.* i. p. 40. *Muhl. gram.* p. 237. *Elliott sk.* ii. p. 542.

Culm 8—12 inches high, erect, slender, triquetrous, subscabrous, leafy below. *Leaves* principally radical and annatinous, very long, except those on the culm, which are abbreviate, and tinged with purple at the base. *Sterile spike* somewhat trigonous, narrow, on a peduncle about an inch in length, at the foot of which the upper fertile spike is situated; *glumes* oblong-ovate, brown, with a white margin and green keel. *Fertile spikes* 2, (sometimes 3), few-flowered, the inferior one sheathed with a long foliaceous bractæ; *glumes* acuminate. *Fruit* ovate-globose, subpedicellate, 3-nerved, very pubescent; rostrum *Wid.* and at length diverging.

HAB. In dry woods, among rocks; Canada to Carolina; common. Flowers in April.

Obs. This species is by some botanists considered as scarcely distinct from *C. varia*. It appears to differ chiefly in

its pedunculate sterile spike, less slender culm, and larger fertile spikes.

65. *CAREX pubescens*, Muhlenberg.

C. spica sterili subsessili; fructiferis ternis, oblongis, erectis. sublaxifloris, infima brevi-pedunculata; fructibus ovato-triquetris, rostratis, pubescentibus, ore subintegro, gluma ovata mucronata subæqualibus; foliis culmoque pubescentibus.

C. pubescens, Willd. *sp. pl.* iv. p. 281. *Schk. car.* t. Eec. f. 126. *Pursh fl.* i. p. 40. *Muhl. gram.* p. 244. *Dewey car.* l. c. ix. p. 73.

Culm 12—18 inches high, rather slender, erect or subdecumbent, leafy below, pubescent above. *Leaves* linear, 2 lines broad, very pubescent, shorter than the culm. *Sterile spike* subtriquetrous, short; *glumes* whitish, green on the keel, which is a little protruded into a point. *Fertile spikes* rather approximate, 4—8-flowered, supported at the base by long foliaceous bractæ; glume ovate-oblong, mucronate. *Fruit* obscurely triangular, rather longer than the glume; rostrum short, with the orifice minutely bifid.

HAB. In woods, rarely in wet situations; Canada to Pennsylvania; not uncommon. Flowers in May.

OBS. This species has not hitherto been found in the Southern States.

66. *CAREX flava*, Lin.

C. spica sterili brevi-pedunculata; fertilibus subternis, ovatis, subapproximatis (infima remotiuscula), breviter incluse pedunculatis; fructibus ovatis, dense imbricatis, bidentatis, cum rostro curvato reflexis, gluma ovato-lanceolata brevioribus.

C. flava, Willd. *sp. pl.* iv. p. 268. *Schk. car.* t. H. f. 36. *Mich. fl.* ii. p. 171. *Pursh fl.* i. p. 41. *Dewey car.* l. c. ix. p. 65.

Culm about 14 inches high, erect, rather firm, leafy. *Leaves* flat, narrow, smooth. *Sterile spike* sessile, or on a short peduncle, often androgynous.

bearing fertile florets either at the summit or at the base: *glumes* reddish-brown, oblong-lanceolate. *Fertile spikes* usually 3, sometimes 2, rarely 4, approximate, ovate, densely fruited, about half an inch long, on very short inclosed peduncles, the lowest one occasionally an inch or more distant from the rest; *bractea* foliaceous, exceeding the culm: *glumes* ovate-lanceolate, brownish-red, shorter than the fruit. *Fruit* ovate, a little inflated at the base, strongly nerved, reflexed, attenuated into a curved beak.

HAB. In meadows, particularly in mountainous districts; Canada to New-York; rare. The most southern station for this plant with which we are acquainted, is Philipstown, in the Highlands of New-York.

Obs. This species, which resembles the European plant in every respect, except in the terminal spike being occasionally androgynous, is not described by Muhlenberg, in his *Descripti. graminum*, though specimens of it, from New-England, exist in his herbarium, and it is enumerated in the second edition of his catalogue. It appears to be a Northern species. In a mature state, every part of the plant is of a greenish yellow colour. It sometimes occurs but 3 or 4 inches high.

67. CAREX *Æderi*, Lin.

C. spica sterili brevi-pedunculata; fertilibus subternis, ovatis, approximatis, subpedunculatis, densifloris; fructibus ovato-globosis, horizontalibus, rostro recto terminatis.

C. Æderi, Lin. *Mich. fl.* i. p. 171. *Eng. bot.* t. 1773. *Devev. car.* l. c. x. p. 33.

C. flava, β *patula*, *Host. gram.* p. 48. t. 64. *Schk. car.* ii. p. 56. t. F. f. 26.

Culm 3—12 inches high, straight and erect, leafy below, obtusely triangular, smooth. *Leaves* narrow, smooth, shorter than the culm. *Sterile spike* nearly sessile, lanceolate, subtrigynous, often androgynous, bearing fertile florets both at the base and summit; *glumes* brown, lanceolate. *Fertile spikes* usually 3, densely fruited, thick, sometimes with a few sterile florets at the summit, closely approximate, or with the lowest spike more or less distant: *bractea* long, flat, foliaceous; *glumes* ovate-

lanceolate, shorter than the fruit, of a brownish color. *Fruit* ventricose, strongly *nerved*, spreading almost horizontally, but not reflexed; *rostrum* rather short and straight; *orifice* entire.

HAB. On the gravelly borders of a small lake in Sussex county, New-Jersey. On rocks about the Falls of Niagara; on the Canada side. *Prof. Dewey*. Near Hudson's Bay. *Michaux*. Flowers in June.

OBS. This species is by many botanists considered as a variety of *C. flava*, but the numerous specimens of it which we have examined, uniformly differed from that plant, in having the fruit horizontal, not reflexed. The spikes in *C. Oederi* are also much more densely flowered, and the fruit but half as large as in *C. flava*; still it is possible they may not be distinct species. In both the whole plant is of a yellowish-green color.

68. *CAREX tentaculata*, Muhlenberg.

C. spicis fertilibus, sessilibus, ovatis vel ovato-cylindraceis, conferte fructiferis approximatis horizontalibus; bracteis longissimis; fructibus ovatis, ventricosis, nervosis, longissime rostratis, ore bidentatis, gluma lanceolata mucronata longioribus.

C. tentaculata, Willd. *sp. pl.* iv. p. 266. *Schk. car.* t. Ggg. f. 130. *Pursh fl.* i. p. 41. *Muhl. gram.* p. 239. *Elliott sk.* ii. p. 543. *Dewey car.* l. c. x. p. 34.

C. rostrata, Mich. *fl.* ii. 173. *Willd. sp. pl.* iv. p. 282. *Schk. car.* t. Hhh. f 134.

Culm about a foot and a half high, triquetrous, leafy, scabrous on the angles. *Leaves* longer than the culm, flat, 2 lines or more in breadth, scabrous. *Sterile spike* sessile, or on a very short peduncle, about an inch in length, with a filiform setaceous bractea at the base; *glumes* reddish-brown, linear-lanceolate, terminated by a long scabrous seta. *Fertile spikes* 2—3, rarely 4, large and thick, from three fourths of an inch to an inch and a half in length, approximate, and spreading almost horizontally; the upper ones sessile, the lowest on a peduncle which is scarcely perceptible; *bractea* resembling the leaves, and very long; *glumes* subulate, about half the length of the fruit, green. *Fruit* ovate, inflated,

spreading, smooth, about 5 nerved, attenuated into a long straight rostrum, which is slightly bifid at the orifice. *Caryopsis* exactly triquetrous, punctulate, scabrous or crenulate on the margin.

HAB. In wet meadows; Canada to Georgia; common. Flowers in May and June. Plant, yellowish-green.

Obs. This species varies considerably in the length of its fertile spikes; sometimes they are ovate, but more frequently nearly cylindrical. They are about the thickness of the little finger, and with the long projecting beaks of the fruit, exhibit a remarkably squarrose appearance. It strongly resembles *C. hystericina*, but differs in its sessile spikes, 5 nerved fruit, &c.

69. *CAREX nigra*, Allioni.

C. spica sterili pedunculata; fertilibus, binis vel tribus, (interdum quaternis) subremotis, oblongis (atris) brevi-bracteatis, sessilibus, erectis; fructibus obovatis, compresso-triquetris, subacutis, ore integris, gluma ovata obtusiuscula subquantibus.

C. nigra, Schk. car. t. Aaa. f. 115. Allioni fl. Pedem. No. 2310. De Cand. syn. fl. Gall. p.

C. saxatilis, Pursh fl. i. p. 33?

Culm 8—12 inches high, erect, triquetrous, very smooth. *Leaves* flat, smooth, rather rigid, shorter than the culm, carinate. *Sterile spike* on a short rigid peduncle, lanceolate; *glumes* oblong, obtuse, with white membranaceous margins. *Fertile spikes* 2—4, (usually 3) rather remote, oblong, or ovate-oblong; *bractea* at the base short; *glumes* ovate, blackish-brown, more or less obtuse, generally about as long as the fruit, but sometimes a little longer; keel prominent and often white, border yellowish. *Fruit* obovate, compressed, a little spreading, smooth, without nerves; orifice very minute, entire. *Stigmas* often 2.

HAB. In Labrador. In wet places around the peak of Mount Washington, one of the highest summits of the White Hills, New-Hampshire. *Dr. Barratt. Dr. Bigelow.* Flowers in July.

Obs. Our specimens from the White Hills, agree in most respects with Schuhkr's description and figure, but there is some doubt whether the plant be identical with the European *C. nigra* with which we cannot compare it, for want of proper specimens.

70. *CAREX lupulina*, Muhlenberg.

C. spica sterili brevis-pedunculata (rarius geminata); sterilibus tribus, subsessilibus, ovato-oblongis, erectis, approximatis; bracteis longissimis, foliaceis; fructibus ovatis, inflatis, nervosis, longissime-rostratis, bicuspidatis, gluma ovata multoties longioribus.

C. lupulina, Willd. *sp. pl.* iv. p. 266. *Schk. car.* t. Ddd.. f. 123. & t. Iiii. f. 194. *Pursh fl.* i. p. 41. *Muhl. gram.* p. 241. *Elliott sk.* ii. p. 544.

C. lurida, Wahl. *Rees's Cyclop.* 145.

Culm 2—3 feet high, very thick, triquetrous, leafy to the top, smooth.

Leaves longer than the culm, flat, one quarter of an inch broad. *Sterile spike* usually solitary, rarely with a smaller sessile one at the base, obscurely triangular, 2—3 inches long, bracteate; *glumes* lanceolate, attenuate into a long hispid very acute point. *Fertile spikes* usually 3 rarely 2, an inch and a half or two inches in length, and as thick as a man's thumb, on short and included peduncles, crowded together in a more or less erect position, each supported by a bractea, resembling in appearance and length, the leaves; *glumes* ovate, mucronate, less than half the length of the fruit. *Fruit* ovate, remarkably ventricose or inflated, distinctly nerved, with a very long acuminate rostrum, which is bifid at the orifice.

HAB. In wet meadows and swamps. Hudson's Bay to Georgia; common. Flowers in June.

Obs. The fertile spikes in this *Carex*, are thicker than in any other known species, and afford a very striking character.

β ? *polystachia*: spicis fertilibus quinis, oblongo-cylindricis, infima remota, longe-pedunculata.

Culm 2 feet high. *Leaves* bracteæ, and sterile spike as in the preceding. *Fertile spikes* generally 5, sometimes but 4, nearly cylindrical, 2-3 inches long; the three upper ones approximate and sterile, the fourth a little distant on a short peduncle, the lowest rather remote, on a peduncle 1-3 inches long. *Fruit* and glumes not perceptibly different from those of *C. lupulina*.

HAB. In wet meadows and swamps. Philipstown, Highlands of New-York. Flowers in the beginning of June. *Dr. Barratt*.

Obs. This variety is very constant in its appearance. It grows in the station mentioned, in great abundance, often in company with the common *C. lupulina*. The spikes are much longer, more numerous, and not so thick as in that plant, but in other respects they do not differ. It resembles *C. retrorsa*, but the fruit is never reflexed.

71. *CAREX folliculata*, Lin.

C. spica sterili pedunculata; fertilibus binis (sæpe solitaria) subrotundis, approximatis paucifloris, suprema sessili, inferiora brevi-pedunculata; bracteis foliaceis; fructibus ovatis, acuminato-rostratis, inflatis, reflexo-divergentibus, bicuspidatis.

C. folliculata, *Lin. Willd. sp. pl.* iv. p. 281. *Schk. car. t. N.* f. 52. *Mich. fl.* ii. p. 172. *Pursh fl.* i. p. 42. *Muhl. gram.* p. 43. *Elliott sk.* ii. p. 545. *Dewey car. l. c. x.* p. 32.

C. intumescens, *Rudge, Lin. trans.* v. p. t. 9. f. 3.

Culm a foot and a half high, leafy, triquetrous, smooth, slender. *Leaves* flat, rather broad, smoothish. *Sterile spike* usually on a long slender peduncle, cylindrical; *glumes* lanceolate. *Fertile spikes* commonly 2, (sometimes 3, *Muhl.*) but in many cases, and in particular localities, but one is found, from 6 to 10-flowered, nearly globose, and about three fourths of an inch in diameter; upper spike closely sessile, lower one on a short or included peduncle; on the summit of each there are a few small sterile florets; *bractæ* foliaceous, very long; *glumes* ovate, acuminate, ending in a filiform point, much shorter than the fruit. *Fruit* ovate, remarkably inflated or ventricose, very large, acuminate into a pretty long beak, smooth and nerved, the upper ones spreading almost horizontally, the lowest a little reflexed.

HAB. In wet meadows and swamps; Canada to Georgia : not uncommon. Flowers in June. Plant dark green.

Obs. According to Muhlenberg, this species sometimes occurs with three fertile spikes. It is most commonly, in the Northern States, found with two, and very often with one. In Schkuhr's figure, which is excellent, it is represented with but one. The *C. intumescens* of Rudge, we think, decidedly belongs to this species; at least to the *C. folliculata* of Schkuhr, Muhlenberg, Willdenow, and most modern botanists. Rudge, however, who considered his plant as a distinct species, has given a figure of *C. folliculata*, taken from an American specimen, and the same as one thus named in the Banksian Herbarium, that a comparison may be made between the two species. The latter is quite different from our *C. folliculata*, and resembles *C. xanthophysa*.

72. *CAREX xanthophysa*, Wahlenberg.

C. spicis fertilibus ternis quarternisve, ovatis, remotissimis pedunculatis, paucifloris; fructibus oblongo-conoideis, subinflatis, striatis, adultis horizontalibus, acutis, bifidis, gluma ovata acuminata longioribus.

C. xanthophysa, *Wahl. car.* No. 73. *Rees's Cyclop.* No. 143. *Dewey*, l. c. vii. p. 274.

C. folliculata, β . *xanthophysa*, *Muhl. gram.* p. 244.

Culm 2—4 feet high, erect, slender, obtusely triangular, smooth, leafy. **Leaves** 3—4 lines broad, long, flat, very smooth. **Sterile spike** lanceolate, nearly an inch long, subsessile, or with a peduncle about its own length; **glumes** ovate, acuminate, carinate. **Fertile spikes** generally 4, but often only 3, ovate, 8—10-flowered, when mature usually very remote (the distance between each being from three to eight inches), appearing as if axillary; the uppermost one subsessile, the rest on peduncles, which are longest in the lowest spikes; **bractæ** resembling the leaves, the upper ones much exceeding the culm; **glumes** ovate, or ovate-lanceolate, acuminate, the apex terminating in a long filiform scarious point, which is commonly shorter, but sometimes as long as the

fruit. *Fruit* about half an inch long, oblong, nerved, gradually tapering into a long very acute point, at first nearly erect, but at length spreading horizontally, and sometimes the lower ones even reflexed: orifice bifid. *Caryopsis* triangular, with the angles obtuse.

HAB. In swamps; Massachusetts to Carolina. Not uncommon in the cedar swamps of New-Jersey. Flowers in June.

Obs. The whole plant is at first of a bright green colour, but it becomes yellowish in age. It varies somewhat in the number and degree of remoteness of the spikes, and in the length of their peduncles, but still it is a species easily recognised, and to all appearances quite distinct from *C. folliculata*. Sometimes there are but two fertile spikes.

73. *CAREX subulata*, Michaux. t. xxvii. f. 1.

C. spica sterili brevi-pedunculata; fertilibus subquaternis, sessilibus vel incluse pedunculatis, remotissimis, paucifloris, apice sterilibus; fructibus subulatis, reflexis, gluma lanceolata multi-longioribus, culmo gracillimo.

C. subulata, Mich. fl. i. p. 173. Pursh fl. i. p.

C. Collinsii, Nutt. gen. ii. p. 205.

Culm two feet or more in height, very slender, inclining on other plants, or decumbent, smooth, obtusely triquetrous, leafy. *Leaves* flat, about a line and a half broad, smooth, shorter than the culm. *Sterile spike* small and slender, on a short peduncle; *glumes* lanceolate, acute. *Fertile spikes* usually 4, but sometimes 3 or 5, seldom more than 4-flowered, the upper ones sessile, the lower on peduncles, which are scarcely exerted, all of them bearing a few sterile florets at the summits; the distance between the two lowest is often 6 inches or more; *glumes* lanceolate, acute, about one third the length of the fruit, spreading. *Fruit* subulate, slightly ventricose, smooth, indistinctly nerved, attenuate into a long slender rostrum, loosely arranged on the rachis, in a somewhat detichous manner; orifice oblique, and remarkably bicuspidate, the points reflexed abruptly so as to become tenacious. *Caryopsis* oblong, obtusely triangular.

HAB. In the deep cedar swamps of New-Jersey. Flowers in July.

OBS. This remarkable and distinct species has been found exclusively in the deep New-Jersey swamps, where it is not uncommon, though, growing in such secluded situations, it has seldom been observed. It has much affinity with *C. xanthophylla*, but it is much more slender, and smaller in all its parts; the form of the fruit is different, and is always completely in maturity. We have never observed it to become yellow in old age.

74. *CAREX alpestris*, Allioni.

C. spicis fertilibus tribus, quinquefloris, binis approximatis sessilibus, infima radicali, longissime pedunculata; fructibus obovato-oblongis, triquetris, brevissime rostellatis, subpubescentibus, ore obliquo, gluma oblonga æquantibus.

C. alpestris, *Willd. sp. pl.* iv. p. 284. *Schk. car.* t. G. f. 35. *Allion pedem.* No 2329. *Dewey car.* l. c. vii. p. 268.

C. gynobasis, *Schk. car.* i. p. 71. *Pers. syn.* ii. p. N. 141.

Culm about 6 inches high.

HAB. On woody hills, Massachusetts. *Dewey.*

OBS. The specimens of this plant which we have received from *Prof. Dewey*, agree exactly with *C. alpestris* of Europe.

2. *Pistilliferous spikes on exsert peduncles, partly sheathed at the base.*

75. *CAREX alba*, Hænke.

C. spica sterili pedunculata; fertilibus geminis ternisque, pedunculatis, subquinquefloris; fructibus obovatis, rostellatis, oblique truncatis; bracteis vaginantibus hyalinis aphyllis.

C. alba, *Willd. sp. pl.* iv. p. 253. *Schk. car.* t. O. f. 55. *Wahl. car.* No. 104. *Dewey car.* vii. p. 266.

Culm 4—10 inches high, subterete, sulcate, filiform, smooth. *Leaves* growing in a thick tuft at the root, subulate, much shorter than the culm, pale green; *sheath* at the base of the culm, bearing a short ovate hyaline bractea. *Sterile spike* on a short peduncle, or almost sessile, proceeding from the same sheath with the uppermost fertile spike, and often lower than this, lanceolate, straw-coloured; *glumes* ovate, obtuse. *Fertile spikes* 2 or 3, ovate, scarcely an eighth of an inch long, the upper two rising to nearly the same level; the third spike when present, a half an inch or more distant, on a slender peduncle enclosed by the hyaline sheath; *glumes* broad-ovate, obtuse, or slightly mucronate, one third shorter than the fruit. *Fruit* ovate and obovate, with a very short beak, smooth, obliquely truncate, black when mature.

HAB. At the foot of limestone hills. Pownal, Vermont. *Prof. Dewey and Mr. Davis.* On rocks about the Falls of Niagara. *Prof. Dewey.* In Watertown, New-York. *Dr. Crane.* Flowers in June.

Obs. This delicate and handsome plant appears to differ from the European *C. alba*, only in being smaller in all its parts. The white hyaline sheaths are a very striking character.

76. *C. x planifolia*. Lamarck.

C. sacris fructibus subquaternis, vix exsertis vel incise perianthiis involutis; fructibus oblongo-cuneiformibus, triquetris, apice recurvatis; culmo basi vaginato; vaginis omnibus subantellis coloratis; foliis latissimis.

4, sometimes 5, when young almost included in the sheaths, but at length appearing with somewhat exerted peduncles; *sheaths* dark purplish brown, in young plants completely concealing the culm, the summit terminating in an ovate cuspidate point, which is usually a little curved, very rarely bearing a short leaf; *glumes* ovate, cuspidate, greenish, spreading, rather shorter than the fruit. *Fruit* oblong, or elliptically triquetrous, attenuate at the base, loosely arranged on the straight rachis rostrum short, oblique, and entire.

HAB. On shady parts of the Alleghany mountains, generally in the west side; plentiful. In woods on the mountainous parts of Massachusetts, particularly in Williamstown. *Dewey*. Flowers in April and May.

Obs. Much confusion has prevailed respecting this *Carex*, and the following. The original *C. plantaginea* of Lamarck, which to us appears to be a very distinct species, is comparatively rare, and has been seen by few botanists. The *C. anceps* in a particular state, when it has very broad leaves, is by most persons confounded with that plant. There is no specimen of *C. plantaginea* in the Herbarium of Dr. Muhlenberg, the species thus named by him being decidedly *C. anceps*, as Dr. Torrey has ascertained. It would appear that neither Schkuhr nor Willdenow, were acquainted with Lamarck's plant. The latter botanist received from Muhlenberg, all the North American Carices, of which he has given descriptions, and the identical specimens were by him communicated to Schkuhr, who had no others from this country. This fact was told us by Professor Willdenow himself, a short time before his death. Still, his description of *C. plantaginea*, agrees pretty well with our plant, and leads us to suspect that part of it was copied from that of Lamarck, especially as he could hardly have received the genuine *C. plantaginea* from Muhlenberg.

77. *CAREX anceps*, Muhlenberg.

C. spicis fertilibus, subtribus, remotis, subcylindricis, laxifloris, inferioribus pedunculatis; fructibus ovatis, obtuse tri-

quetris, acutis striatis, basi elongatis ore obscure bidentata, gluma ovata cuspidata longioribus vel subæqualibus.

C. anceps, Willd. *sp. pl.* iv. p. 278. *Schk. car.* t. Fff. f. 123.

Pursh fl. i. p. 42. *Dewey car.* l. c. x. p. 35.

C. plantaginea, Muhl. *gram.* p. 235. *Elliott sk.* ii. p. 547.

C. heterosperma, Wahlenberg.

Culm high, (sometimes taller) triquetrous, with two of the sides much broader than the other, smooth. *Leaves* variable in breadth, the radical ones often an inch or more broad, especially after the plant has done flowering, smooth, striate or reticulate, and considerably glaucous; culm leaves much narrower, very long; sheaths white and membranaceous. *Sterile spike* pedunculate, the peduncle compressed; *glumes* generally 3, sometimes 4, and according to Muhlenberg, even 5, ovate, obtuse or acute; margin white; keel green. *Fertile spikes* about an inch long, 10—12-flowered; inferior peduncles subanapitous, and exserted; *glumes* ovate, cuspidate, or subemarginate, with a short bristle at the apex, at first shorter, but in the mature plant a little longer than the fruit, whitish. *Fruit* ovate, conspicuously striate, smooth, alternately distant on the somewhat flexuous rachis, with a short rostrum.

HAB. In woods; Canada to Carolina; very common. Flowers in April and May.

Obs The hyemal and radical leaves, after the plant has done flowering, are very broad and resemble those of *Plantago lanceolata*; hence many botanists have confounded it with the *C. plantaginea* of Lamarck, but it is easily distinguished from the plant by comparing it with our description. Sometimes radical leaves are quite narrow, but still it is a species easily recognised when once known.

78. *CAREX oligocarpa*, Schkuhr.

C. spicis fertilibus tribus, pedunculatis, paucifloris; pedunculis inferioribus elongatis; fructibus brevi-ovatis, acute triquetris, rostellatis, ore integris, gluma ovata longioribus.

C. oligocarpa, Willd. *sp. pl.* iv. p. 279. *Schk. car.* t. Vv.

170. *Pursh fl.* i. p. 44. *Muhl. gram.* p. 242.

Culm about 6 inches high, triquetrous, with the angles very prominent, striate, smooth, filiform, leafy, at length subdecumbent. *Leaves* a little glaucous, rather thin and delicate; the inferior ones abbreviate. *Sterile spike* on a curved peduncle, about three fourths of an inch long; *glumes* lanceolate, acuminate, carinate, pale yellowish-brown. *Fertile spikes* 2—3, oblong, 5—8-flowered, the upper one often subsessile, the others on filiform peduncles, which are frequently two inches or more in length; *glumes* ovate, broad at the base, acute, two thirds the length of the fruit, pale brown, with the carina green. *Fruit* remarkably triquetrous, short-ovate, striate, very loosely arranged on the rachis, with a short obtuse and oblique, or slightly curved rostrum; orifice entire, submembranaceous.

HAB. In dry rocky woods, and on hill sides; Hudson Bay to Pennsylvania; not uncommon in mountainous districts.

Flowers in May. It grows in tufts.

Oss. This plant, especially when young, has the appearance of *C. anceps* in a depauperate state, but when mature it is easily distinguished by its narrower and delicate leaves, few-flowered spikes, small and remarkably triquetrous fruit.

79. *CAREX scabrata*.*

C. spicis fertilibus subquinis, subremotis, cylindræis, plerumque erectis, inferioribus longe-pedunculatis; fructibus ovatis, acuminato-rostratis, subventricosus, scabris, ore obliquo subbifido, gluma ovato-lanceolata ciliata longioribus.

C. scabrata, Schw. an. tab. car. l. c. Dewey car. l. c. ix. p. 66.

Culm about a foot and a half high, remarkably triquetrous above, somewhat ancipitous below, leafy. *Leaves* long, very scabrous, 2—3 inches long, very scabrous, 3 lines broad, the lowest one considerably broader, of a coarse and rank appearance. *Sterile spike* on a moderately long rigid peduncle; *glumes* lanceolate, brown with a green keel. *Fertile spikes* 3—5, subcylindrical, densely fruited; the upper ones rather approximate and subsessile, the others distant from one to three inches, pedunculate; the lowest sometimes a little nodding; *bractæ* resembling the leaves, overtopping the culm; *glumes* ovate-lanceolate, subciliate on the margin, scabrous at the apex, about two thirds as long as the fruit, brownish. *Fruit* ovate, triquetrous, sides subcarinate, very scabrous.

83. *CAREX granularis*, Muhlenberg.

C. spica sterili sessili vel brevi-pedunculata ; fertilibus subtribus, remotis, cylindricis, densifloris, superioribus, subsessilibus, infima longe-pedunculata ; fructibus globoso-ovatis, nervosis, ore integris, brevissime rostellatis ; rostro recurvo.

C. granularis, Willd. *sp. pl.* iv. p. 279. *Schk. car.* t. Vvv. f. 169. *Pursh fl.* i. p. 42. *Dewey car.* l. c. vii. p. 272.

Culm generally about a foot high, erect, slender, triquetrous, leafy, smooth. *Leaves* erect, rather glaucous, the upper ones longer than the culm ; lower ones abbreviate ; *sheaths* white and membranaceous on the inside. *Sterile spike* about three fourths of an inch long, usually closely sessile at the base of the upper fertile spike, which it scarcely exceeds in length, fructiferous at the summit : *glumes* ovate, acute or obtuse. *Fertile spikes* 3 or 4, about an inch long, cylindrical and densely fruited ; the uppermost one sessile, the next on an exsert peduncle. the lowest long-pedunculate ; *glumes* broad-ovate, membranaceous, acuminate, shorter than the fruit, carinate. *Fruit* roundish-ovate, somewhat ventricose, strongly nerved, with a very short somewhat gibbous and recurved rostrum.

HAB. In wet meadows ; Canada to Pennsylvania ; common. Flowers in May.

Obs. Whole plant at first glaucous ; in maturity the spikes are dull orange-yellow. It is usually about a foot high, but in favorable situations it is often much taller. We have specimens from Dr. Holmes of Montreal, collected by that gentleman in Lower Canada, in which the terminal spike is androgynous.

84. *CAREX ustulata*, Wahlenberg.

C. spicis fertilibus binis, ovatis, pedunculatis, nutantibus ; fructibus ovatis, acuminatis, bidentatis, compressis, gluma elliptica longioribus.

C. ustulata, Wahl. *act. holm.* 1803. p. 150. *Willd. sp. pl.* iv. p. 295. *Schk. car.* t. Y. f. 82.

Culm about 8 inches high, very leafy below; stoloniferous at the base. *Leaves* narrow, smooth; the lower ones very short. *Fertile spikes* 2—3, ovate, black, all of them pedunculate and nodding.

HAB. In Labrador.

OBS. Our specimens of this *Carex*, exactly agree with the European one figured by Schkuhr.

85. *CAREX capillaris*, Lin.

C. spicis fertilibus subternis, longe-pedunculatis, cernuis, subsexfloris; fructibus ellipticis, rostratis, distantibus, ore obliquo, gluma ovata longioribus.

C. capillaris, Willd. *sp. pl.* iv. p. 290. *Schk. car. t. O. f. 56.*
Richard. app. Frank. nar. ed. 2. p. 36.

Culm 4—6 inches.

HAB. In the woody region of Arctic America. *Dr. Richardson.*

OBS. Our specimens were presented by Dr. Richardson, and exactly agree with the European plant.

86. *CAREX sylvatica*, Hudson.

C. spicis fertilibus subquaternis, remotis, filiformibus, subdensifloris, pedunculis cernuis; fructibus ovatis, rostratis bifidis, gluma ovato mucronata duplo longioribus.

C. sylvatica, Willd. *sp. pl.* iv. p. 296 *Schk. car. t. Ll. f. 101.*
Hudson fl. Ang. p. 353. Dewey car. l. c. x. p. 40.

C. Drimeja, Lin. *supp.* 414. *Wahl. No. 79.*

Culm 12—18 inches high, erect, slender, compresso-triquetrous, scabrous on the angles, leafy. *Leaves* shorter than the culm, 2 lines broad, flat, erect. *Sterile spike* on a peduncle about a quarter of an inch long, slender, scarcely extending beyond the uppermost spike; *glumes* lanceolate, acute, white, with a green carina. *Fertile spikes* usually 4, sometimes 5, about an inch and a half long, on exserted filiform peduncles, at length more or less cernuous, but occasionally nearly erect; the uppermost

ones nearly destitute of bractæ; glumes obovate, mucronate, white and membranaceous, carinate, shorter than fruit. *Fruit* ovate, broad at the base, erect, imbricate, so as generally to conceal the rachis, with 3 prominent nerves; rostrum pyramidal, orifice slightly bifid.

HAB. In Williamstown, Massachusetts. *Prof. Dewey*. Plain-field in the same state. *Dr. Porter*. In the vicinity of Montreal, Lower Canada. *Dr. Holmes*. Flowers in the latter part of May.

Oss. This plant is probably not uncommon in New England. Compared with European specimens of *C. sylvatica*, it was scarcely found to differ in any respect. Color of the plant light green.

87. *CAREX flexuosa*, Muhlenberg.

C. spicis fertilibus subquaternis, remotis, filiformibus, pedunculis cernuis; fructibus distantibus, alternis, oblongis, utrinque acutis, rostratis; bifidis, gluma ovata mucronata duplo longioribus.

C. flexuosa, Willd. *sp. pl.* iv. p. 297. *Schk. car.* t. Ddd. et Aaaa. f. 124. *Pursh fl.* i. p. 43. *Muhl. gram.* p. 253. *Elliott sk.* ii. p. 550. *Dewey car.* x. p. 40.

C. debilis, Mich. *fl.* ii. p. 172.

C. tenuis, Rudge *Lin. trans.* vol. 7. p. 96. t. 9. f. 2. *Rees Cyclop.* No. 154.

Culm a foot and a half or two feet high, frequently procumbent in age, slender, leafy, somewhat scabrous. **Leaves** narrow, about as long as the culm. **Sterile spike** very narrow, on a filiform peduncle half an inch in length, sometimes bearing one or two fertile florets at the summit; **glumes** lanceolate, rather obtuse, carinate, white and green. **Fertile spikes** 3—4, an inch and a half or two inches long, 12—18-flowered, on exsert filiform peduncles, an inch or more in length; **rachis** at length flexuous, and not entirely concealed by the fruit; **glumes** ovate-lanceolate, acuminate, half the length of the fruit, at length brown. **Fruit** oblong-lanceolate, nerved, triquetrous, smooth, acuminate, at first green, but becoming chestnut brown.

HAB. In meadows and wet woods; Canada to Georgia; common. Flowers in June.

OBS. Sometimes this species occurs scarcely a foot in height. Muhlenberg does not describe the fertile spikes correctly, but the specimens in his herbarium exactly resemble our plant.

88. *CAREX podocarpa*, R. Brown.

C. spicis fertilibus binis, pendulis, oblongis; fructibus ellipticis, brevissime rostellatis, integris, lævibus, achenisque pedicellatis; foliis inferioribus abbreviatis.

C. podocarpa, R. Brown, in *Rich. app. Frank. nar.* ed. 2. p. 36.

HAB. On the barren grounds of Arctic America. Dr. Richardson.

3. *Pistilliferous spikes on long peduncles, nearly destitute of sheaths.*

89. *CAREX umbellata*, Schkuhr.

C. cespitosa; spicis fertilibus subquaternis, ovatis, paniculatis; una sessili, in summo culmo, cæteris pedunculatis; pedunculis subradicalibus, quasi umbellatis; fructibus ovatis, acuminato-rostratis, subpubescentibus, gluma ovata acuminata æqualibus.

C. umbellata, Willd. *sp. pl.* iv. p. 290. Schk. *car.* t. Ww. f. 170. Pursh *fl.* i. p. 44. Muhl. *gram.* p. 256. Dewey *car.* l. c. x. p. 31.

Culm frequently not more than half an inch high, but late in the season, and in favourable situations, growing to a span in height. *Leaves* radical, longer than the culm, erect, narrow, scabrous. *Sterile spike* solitary, oblong, on a short oblique peduncle, at the foot of which there is a nearly sessile fertile spike; *glumes* ovate, acute, pale brown. *Fertile spikes* about 4, sometimes 5, or only 3, ovate, 6—8-flowered; one of them, (sometimes 2) situated at the summit of the culm, ebracteate; the rest on peduncles of nearly equal length, which issue from the ap-

proximate subradical sheaths; sometimes the peduncles are so short that the spikes are nearly concealed by the dense tuft of leaves, but more frequently they are from half an inch to an inch or more in length; *glumes* ovate, cuspidate, green. *Fruit* ovate, a little contracted at the base, triquetrous, pubescent under a lens, but nearly smooth when old: rostrum acuminate, bidentate at the orifice.

HAB. On rocky hill sides, particularly in mountainous districts. In Williamstown, Massachusetts. *Prof. Dewey*. Abundant along the Connecticut river. Common in the Highlands of New-York. In Pennsylvania. *Muhlenberg*. Flowers in the latter end of April, and in the beginning of May. Grows in dense clusters.

OBS. 1. Schkuhr's figure of this species is very good, but it does not represent the upper sessile spike, which is a very constant character, except in the dwarf state of the plant. 2. The fertile spikes appear to be subumbellate, on account of the radical peduncles being of nearly equal length. Sometimes they are crowded in clusters and almost sessile among the leaves.

90. *CAREX miliacea*, Muhlenberg.

C. spicis fertilibus tribus, graciliter cylindraceis, cernuis, pedunculis filiformibus; fructibus ovatis, triquetris, enerviis, breve rostratis, ore integris, gluma ovato-lanceolata subæqualibus.

C. miliacea, Willd. *sp. pl.* iv. p. 290. *Schk. car.* t. Ooo. f. 151. *Pursh fl.* i. p. 41. *Muhl. gram.* p. 257. *Elliott sk.* ii. p. 552. *Dewey car.* l. c. x. p. 30.

C. prasina, Wahlenberg. *Rees' Cyclop.* No. 137.

Culm about 15 inches high, slender, erect, compressed-triquetrous, leafy, nearly smooth. *Leaves* rather narrow, as long as the culm, scabrous on the margin. *Sterile spike* slender, an inch or more in length, thickening towards the summit, which frequently bears some fertile florets; peduncle filiform, three fourths of an inch long; *glumes* oblong, loosely imbricate, mucronate and carinate; the sides pale brown; keel green. *Fertile spikes* very constantly 3, subapproximate, filiformly cylindrical.

an inch and a half or two inches in length, rather densely fruited except towards the base, nodding; *peduncles* filiform, the lower ones longest, supported at the base by a narrow foliaceous *bractea*; *glumes* acuminate, about as long as the fruit in the middle part of the spike; longer in the lower part, shorter in the upper: sides pale brown, keel green. Fruit ovate, rather broad at the base, very green, distinctly triquetrous, without nerves on the sides; orifice membranaceous, entire or emarginate. *Caryopsis* subcordate-triquetrous.

HAB. In moist meadows; Canada to Georgia; common. Flowers in May.

OBS. This is a delicate and beautiful species. It can scarcely be confounded with any other *Carex*.

91. *CAREX pallescens*, Lin.

C. spicis fertilibus binis aut subternis, ovato-cylindricis, densifloris, demum subcernuis; fructibus obovato-oblongis, obtusis; vaginis culmoque pubescentibus.

C. pallescens, Willd *sp. pl.* iv. p. 291. *Schk. car.* t. Kk. f. 90. *Fl. Dan.* t. 1050. *Dewey car.* l. c. vii. p. 267.

Culm about a foot high, sometimes considerably less, erect, slender, triquetrous, sulcate, leafy below, pubescent. *Leaves* shorter than the culm, more or less pubescent; *sheaths* retrorsely pubescent. *Sterile spike* lanceolate, trigonous, on a short straight peduncle; *glumes* broad ovate, brown, with the keel green, ciliate towards the extremity. *Fertile spikes* usually 2, sometimes 3, at first erect, when old more or less cernuous, elliptic, and oblong-cylindrical, thick; *peduncles* half an inch long in the lower spike, less in the upper; *glumes* ovate, acuminate, reddish-brown, with a green keel about as long as the fruit, not ciliate. *Fruit* very obtuse, pale green when ripe; orifice minute and entire.

HAB. In wet meadows. In Berkshire county, and in other parts of Massachusetts. *Prof. Dewey, Mr. Davis, and Mr. Hitchcock.* In the Highlands of New-York. *Dr. Barratt.* Flowers in May.

OBS. This plant agrees perfectly with our European specimens of *C. pallescens*. It much resembles *C. granularis*, but the spikes are shorter, the fruit more obtuse, leaves pubescent, &c.

92. *CAREX hystericina*, Willdenow.

C. spica sterili pedunculata; fructiferis subternis, oblongo-cylindræis, crassis, demum cernuis, suprema incluse pedunculata, cæteris exserte pedunculatis; fructibus ovatis, inflatis, subhorizontalibus, multinerviis, rostratis, ore bifido, gluma oblonga aristata duplo longioribus.

C. hystericina, Willd. *sp. pl.* iv. p. 282. Schk. *car.* t. Fff. f. 127. Pursh *fl.* i. p. 43. Muhl. *gram.* p. 252. Elliott *sk.* ii. p. 550.? Dewey *car.* l. c. x. p. 25.

Culm about a foot and a half high, acutely triquetrous, leafy, scabrous above. Leaves longer than the culm, 2 lines broad, scabrous. Sterile spike on a peduncle 1—3 inches long, cylindrical, triangular, bracteate, often bearing a few fertile florets at the summit, or at the base; glumes ovate-lanceolate, mucronate, pale brown, with the keel green. Fertile spikes 2—4, generally 3, about an inch in length, densely fruited, at length nodding, an inch or more distant; upper one on a very short included peduncle, the others on filiform peduncles, from three fourths of an inch to two inches in length; glumes oblong, emarginate, ending in a scabrous awn, not half the length of the fruit. Fruit oblong, marked with numerous distinct striae, smooth, terminated by a long rostrum, which is bifid at the extremity, at length spreading almost horizontally. Caryopsis ovate-triquetrous, angles smooth.

HAB. In wet meadows; Canada to Georgia; rather common. Flowers in the end of May.

Obs. This species strongly resembles *C. tentaculata*, but may be distinguished from it by its pedunculate spikes, many-nerved fruit, and more delicate habit. Sometimes the upper fertile spike is sterile at the summit, and the lowest one very remote, on a peduncle three or four inches long. The whole plant is of a yellowish-green color.

93. *CAREX Pseudo-cyperus*, Lin.

C. spicis fertilibus quaternis, cylindricis, pedunculatis pendulis crassis, superioribus subgeminatis; fructibus oblongo-lanceolatis, rostratis, reflexis, multinerviis, apice divaricato bifidis.

- C. Pseudo-cyperus*, Willd. *sp. pl.* iv. p. 295. Schk. *car.* t. Mm. f. 102. Pursh *fl.* i. p. 44. Muhl. *gram.* p. 253. Dewey *car.* l. c. viii. p. 71.
C. furcata, Elliott *sk.* ii. p. 552.

Culm 2—3 feet high, acutely triquetrous, thick, very scabrous on the angles. *Leaves* longer than the culm, 3 lines broad, rough and coarse. *Sterile spike* on a short peduncle, about an inch and a half in length, thick; *glumes* loosely imbricate, long-lanceolate, mucronate, pale brown. *Fertile spikes* usually 4, often two inches or more in length, densely fruited, the 2 uppermost closely approximate, and appearing geminate; peduncles recurved, scabrous, the lowest exerted about an inch, all of them supported by very long foliaceous bractæ, resembling the leaves; *glumes* lanceolate, cuspidate, about two thirds as long as the fruit. *Fruit* retrorsely imbricate, prominently striate, deeply bifid at the summit, the divisions forked, and almost reflexed.

HAB. In deep swamps; Canada to Georgia; not uncommon. Flowers in June.

OBS. Our plant resembles in all respects the European *C. Pseudo-cyperus*.

94. *CAREX glaucescens*, Elliott. ?

- C. spicis fertilibus* 3—4, cylindricis, pedunculatis, demum pendulis; fructibus brevi-ovatis, basi ventricosis, triquetris, glaucis brevi-rostratis, ore bifido, gluma emarginata mucronata subæquantibus; foliis glaucis.
C. glaucescens, Elliott *sk.* ii. p. 553. ?
C. sempervirens, Schw. *an. tab.* l. c.

Culm leafy below, with numerous annottinous shoots, forming large dense tufts three feet high, triquetrous, angles sharp and scabrous. *Leaves* a little shorter than the culm, canaliculate, narrow in proportion, glaucous. *Sterile spike* on a rigid, but very long peduncle, of a remarkably trigonous form; *glumes* oblong-ovate, brown, with a long scabrous calate midrib produced into a point. *Fertile spikes* 3—4, appearing axillary in the foliaceous bractæ, but not sheathed by them, on filiform but rather rigid peduncles, an inch or more in length, cylindrical and pretty thick; *rachis* straight; *glumes* ovate, emarginate, with a scabrous point, about as long as the fruit. *Fruit* short-ovate, ventricose at the base.

but not inflated, glabrous, of a brown color when ripe, with a short conical rostrum, bifid, and diverging at the orifice. *Caryopsis* triquetrous, smooth on the margin.

HAB. In woody swamps between Hillsborough and Chapel Hill, North Carolina, forming very large evergreen tufts. About pine-barren ponds, Georgia. *Elliott*. Fruit ripe in July.

Obs. The plant which we formerly considered as a new species, and called *C. sempervirens* in the Analytical Table of Carices, appears to be the *C. glaucescens* of Mr. Elliott, whose description was published only the last year. The latter differs in some respects, but it is probably not distinct.

95. *CAREX Elliottii*, *

C. spicis fertilibus tribus, subrotundis, infima longissime pedunculata, cernua, superioribus sessilibus ; fructibus ovatis, triquetris, glabris, punctulatis, gluma ovata obtusa multo longioribus.

C. castanea, *Elliott sk.* ii. p. 546. (nec *Wahl.*)

C. fulva, *Muhl. gram.* p. 246. *Herb.* No. 365.

Culm about two feet high, triquetrous, slender, purple at the base. *Leaves* linear, nerved, scabrous on the margin, shorter than the culm. *Sterile spike* about an inch long, much shorter than its three-nerved bracteal leaf; *glumes* oblong, obtuse, brown, with a white margin. *Fertile spikes* 3, 9—16-flowered, the upper bearing at the summit a few sterile florets, sessile, as well as the middle spike; the lowest on a long peduncle; *glumes* ovate, obtuse, not emarginate nor mucronate. *Fruit* inflated, ovate, obtusely triquetrous, distinctly nerved, terminating in a long beak, 2 cleft at the summit, somewhat coriaceous, lucid and transversely striate, resembling under a lens, the surface of fine morocco leather. *Caryopsis* triquetrous. *Muhlenberg*.

HAB. In wet pine barrens. Chatham County, Georgia. Flowers in April. *Elliott*.

Obs. Mr. Elliott remarks that this *Carex* has a strong affinity to *C. folliculata*, but differs from it, in its fruit and glumes. Its habit is also coarser.

96. *CAREX limosa*, Lin.

C. spicis fertilibus subbinis, ovatis, vel oblongo-ovatis, pedunculatis subdistantibus, pendulis; fructibus suborbiculato-ellipticis, compressis, brevissime rostellatis (viridibus) ore integris, gluma ovata mucronata subæquantibus.

C. limosa, Willd. *sp. pl.* iv. p. 293. *Wahl. act. Holm.* 1803. p. 161. *Schk. car.* t. X. f. 78. *Rich. app. Frank. nar. ed.* 2. p. 36. *Dewey car.* l. c. x. p. 41.

C. lenticularis, Mich. *fl.* ii. p. 172. *Dewey car.* l. c. vii. p. 273.

Culm usually about 9 inches high, but occasionally attaining the height of two feet, erect, triquetrous, very smooth. *Leaves* mostly radical, narrow in proportion, much shorter than the culm, smooth and subglaucous; inferior sheaths brown at the base. *Sterile spike* about three fourths of an inch long, on a straight filiform peduncle; *sheaths* of the bractes very short; *glumes* ovate, carinate, mucronate, brown, the keel green. *Fertile spikes* generally two, but often solitary, rarely 3, situated near the summit of the culm, on filiform peduncles about three fourths of an inch long, more or less ovate, rather loosely flowered, at first horizontal, but at length pendulous, thick; *glumes* variable in length, generally about the length of the fruit, ovate or oblong, acuminate or cuspidate, sometimes obtuse, brown, (rarely green). *Fruit* roundish elliptical, compressed and appearing lenticular, minutely rostrate, smooth, and distinctly 3-nerved on each side, glaucous, green, punctulate.

HAB. In sphagnous swamps and on the borders of mountain lakes. Flowers in June. In a swamp at Greenbush near Albany, New-York. *Dr. E. James*. In various parts of Massachusetts, as Ashfield, *Dr. Porter*; Stockbridge and Becket, *Dr. Emmons*; Ipswich, *Mr. Oakes*. On the margin of Blue-pond, summit of Mt. Washington, New-Hampshire, *Dr. Barratt*. In the woody region of Arctic America. *Dr. Richardson*. About Swan Lake. *Michaux*.

Obs. Several varieties of this species are described by *Wahlenberg*, in his *Flora Lapponica*; his *β. irrigua* occurs among our specimens from the White Hills, and from one

or two Massachusetts localities, and Prof. Dewey has found his *γ. rariflora* (which is considered as a distinct species by Smith) and *δ. livida*. He adds also a new variety *ε. oblonga*: spikes rather long-cylindric. Our plant differs in no respect from the European *C. limosa*, except in the nerves of the fruit being more distinct. It agrees with Michaux's description of his *C. lenticularis*, but whether it certainly be that species or not, can only be determined by a comparison with his specimens.

* *Staminiferous spikes two or more.*

a. *With two stigmas.*

97. *CAREX cespitosa*, Lin.

C. spica sterili subsolitaria (vel geminata); fertilibus subtribus, cylindraceis, obtusis, distantibus, infima brevissime exserte pedunculata; bracteis strictis; fructibus ovatis, acutiusculis, dense suboctofariam imbricatis, ore pertusis, gluma ovata (nigra albomarginata) majoribus; foliis patulis.

C. cespitosa, Willd. *sp. pl.* iv. p. 287. Schk. *car.* t. Aa. et Bb. f. 85. Pursh *fl.* i. p. 38. Muhl. *gram.* p. 264. Elliott *sk.* ii. p. 536.

Culm a foot and a half high, smooth, triquetrous. *Leaves* dark green, 2 lines broad, flat, smooth except on the margin. *Sterile spike* solitary or geminate, on a rigid peduncle, large; *glumes* oblong, very obtuse, reddish brown, with a green keel. *Fertile spikes* 3—4, (occasionally 5.) slender, erect, the lowest two inches or more in length, the upper ones gradually shorter and subsessile, sometimes staminiferous at the summit; *glumes* blackish brown, with a white border, the keel green, obtuse, two thirds the length of the fruit. *Fruit* ovate, rather acute, compressed-triquetrous, without nerves, green; orifice minutely bidentate.

HAB. In mountain bogs; rarely in lowlands; Canada to Pennsylvania; not common. Flowers in May.

Obs. The North American *C. cespitosa* is taller than the European plants is said to be; in other respects there is no apparent difference.

98. *CAREX crinita*, Lamarek.

- C. spicis sterilibus geminis, (interdum androgynis) ; fertilibus quaternis, distantibus, pendulis, cylindraceis, densifloris; fructibus subrotundo-ovatis, ventricosis, brevissime rostellatis, ore integris, gluma lineari duplo vel triplo brevioribus.*
- C. crinita*, *Lam. enc.* iii. p. 379. *Willd. sp. pl.* iv. p. 300. *Schk. car.* t. Eee. f. 125. et *Tu. f.* 164. *Rees' Cylop.* No. 171. *Pursh fl.* i. p. 38. *Muhl. gram.* p. 229. *Elliott sk.* ii. p. 536.
- C. paleacea*, *Wahl. act. holm.* 1803. p. 164. *Rees' Cyclop.* 141.
- C. leonura*, *Wahl. (secund. Swartz, Muhl.)*

Culm 2—4 feet high, erect, triquetrous on the angles. *Leaves* longer than the culm, pale green, 3—4 lines broad. *Sterile spikes* 1—2, long and slender, cernuous, one long-pedunculate, the other subsessile, frequently fertile at the summit; *glumes* linear subulate, hispid. *Fertile spikes* generally 4, but sometimes 5, very densely fruited, often stamiferous at the summit, cylindrical, 2—3 inches long, on peduncles which increase in length downward, and are supported by long leafy bractæ, all of them pendulous and incurved; *glumes* lanceolate, ending in a very long hispid point, which is from two to three times as long as the fruit, spreading, carinate. *Fruit* very short and dilated-ovate, somewhat ventricose, nerved, smooth; rostrum short, with the orifice minute and entire.

HAB. In swamps; Canada to Georgia; common. Flowers in June.

β. gynandra: *spicis fructiferis subternis, oblongo-cylindricis, fructibus brevi-ovatis, gluma aristata paulo longioribus.*

Culm 12—13 inches high. *Leaves* 2—3 lines broad, mostly radical. *Sterile spikes* 1—2, very often with fertile florets either at the summit or the base; *glumes* lanceolate, acute. *Fertile spikes* 3—4, about two inches long, thicker, but not as densely fruited as in the preceding species, nodding; *glumes* ovate, mucronate; the scabrous points projecting a little beyond the fruit, yellowish, with the keel and point green. *Fruit* broad-ovate, smooth, and of a yellow color when young.

HAB. In wet meadows; Canada to North Carolina; rather rare.

OBS. The variety β . may prove to be a distinct species. Its characters are pretty constant, but sometimes it appears to pass into the ordinary *C. crinita*. It has much the appearance of *C. miliacea*, but it is easily distinguished. Occasionally all the spikes are fertile. We have another variety of *C. crinita*, collected in New-Hampshire by Capt. Le Conte. This has three sterile and as many fertile spikes; the latter are oblong-cylindrical: the glumes subulate, and five or six times exceeding the fruit in length.

99. *CAREX acuta*, Lin.

C. spicis sterilibus 1—3; *fertilibus subternis, subpedunculatis, subnulantibus, cylindraceis, remotis; fructibus oblongis, ore integro, pertuso, gluma oblonga acuta subæquantibus.*

C. acuta, Willd. *sp. pl.* iv. p. 304. *Schk. car.* t. Ee. & Ff. f. 92. *Pursh fl.* i. p. 98. *Muhl. gram.* p. 263. *Elliott sk.* ii. p. 537.

Culm 2 feet high, remarkably triquetrous, very scabrous on the angles, leafy at the base. *Leaves* erect, subglaucous. *Sterile spikes* 1—3, often solitary, straight and erect, cylindrical; *glumes* oblong-lanceolate, mostly obtuse, light brown, with the keel green. *Fertile spikes* generally 3, (sometimes 2), the lowest on a short peduncle; upper ones often sterile at the summit; *glumes* oblong-lanceolate, rather obtuse, dark brown, with a green keel, little longer than the fruit. *Fruit* obtusely triquetrous, without nerves; rostrum very short, orifice minute.

HAB. In wet meadows; Canada to Georgia; common. Flowers in May.

OBS. This common species appears to differ in no essential respect from the European *C. acuta*.

b. *With three stigmas.*

100. *CAREX Barrattii*, *.

C. spicis sterilibus subgeminis; fertilibus subtribus, oblongo-cylindraceis, apice staminiferis, cernuis, distantibus; fru

which are appressed to the culm; *glumes* ovate, long-acuminate, nerved, about two thirds as long as the fruit, reddish, with the keel green. *Fruit* subinflated below, distinctly hairy, acuminate or rostrate, bicuspidate.

HAB. In swamps; Canada to Georgia; not rare. Flowers in the end of May.

OBS. We have rarely found the sterile spikes pistilliferous at the summit, as they are represented by Schkuhr, but we have seen the upper fertile spike occasionally sterile at the apex.

102. *CAREX verrucosa*, Muhlenberg.

C. spicis sterilibus subgeminis; fertilibus 4—5, inferioribus longe-pedunculatis, patulis, apice staminiferis, cylindricis; fructibus ovatis, subtriquetro-compressis, punctatis, ore subbidentato, gluma ovata obtusa brevioribus.

C. verrucosa, *Muhl. gram.* p. 261. *Elliott sk.* ii. p. 555.?

Culm about 3 feet high, rather slender, sometimes decumbent, leafy, scabrous above. *Leaves* very long, glaucous, nerved, and conspicuously cross-barred, scabrous on the margin, with very loose sheaths; the outer ones abbreviate. *Sterile spikes* 2, or solitary; terminal one obtuse and pedunculate; *glumes* oblong, obtuse or retuse, brown, with the keel green. *Fertile spikes* mostly 5, the lower ones distant, and on considerably long peduncles; upper ones approximate and subsessile; all of them generally sterile at the summit; *glumes* ovate, obtuse, brown, carinate. *Fruit* ovate, with one conspicuous nerve, punctate under a lens, but not pubescent; rostrum minute, bifid.

HAB. On the banks of a meadow-brook, North Carolina. In Georgia and South Carolina. *Muhlenberg*. Flowers in May.

OBS. The *C. verrucosa* of *Mr. Elliott*, is probably the same as the one we have described, though his description does not apply in all respects. The name is by no means appropriate.

103. *CAREX filiformis*, Lin.

C. spicis sterilibus geminis; fertilibus geminis, ovato-oblongis, sessilibus, distantibus; fructibus ellipticis, villosis, bifurcatis, gluma ovato-lanceolata, subaristata æqualibus; foliis convolutis.

C. filiformis, Willd. sp. pl. iv. p. 303. Schk. car. t. K. f. 54. Dewey car. l. c. vii. p. 268.

Culm 2—3 feet high, slender, obscurely triangular, smooth. *Leaves* principally forming a large tuft about the root, 2—3 feet long, channelled or convolute, ending in a long filiform point. *Sterile spikes* 2, on a long common peduncle, the upper one elongated, cylindrical and slender, the other sessile; *glumes* oblong, acute, brown, with a green keel. *Fertile spikes* usually 2, sometimes solitary, about two inches distant, oblong, sessile, supported by filiform bractæ, densely fruited; *glumes* dark brown, with a green carina, acuminate. *Fruit* elliptical, densely villos, with a divergingly bifid short rostrum.

HAB. In overflowed bog meadows, and in the borders of ponds near Hope, New-Jersey. Philipstown in the Highlands of New-York. *Dr. Barratt.* Westfield. Massachusetts. *Mr. Davis.* Near Williams College. *Prof. Dewey.*

OBS. The North American plant agrees exactly with our European specimens, and with Schkuhr's figure and description.

104. *CAREX aristata*, R. Brown.

C. spicis fertilibus ternis quaternisve, cylindraceis, distantibus, brevipedunculatis; fructibus glaberrimis, nervosis, rostro longissimo albe bifido lævi, laciniis patentibus; glumis omnibus aristatis; foliis subtus vaginisque villosis.

C. aristata, R. Brown, in Richard. app. Frank. nar. ed. 2. p. 36.

HAB. In the woody region of Arctic America. *Dr. Richardson.*

OBS. This species is said to be between *C. bullata* and *la-custris*. It is altogether different from *C. aristata*, Dewey. (*C. Davisii*. nobis.)

105. *CAREX vesicaria*, Lin.

C. spicis sterilibus subtribus; fertilibus subgeminis, pedunculatis, cylindraceis; fructibus oblongis, inflatis, acuminate-rostratis, bicuspidatis, gluma lanceolata majoribus; culmo acute triquetro.

C. vesicaria, Willd. *sp. pl.* iv. p. 307. *Schk. car.* t. Ss. f. 106. *Pursh fl.* i. p. 45. *Muhl. gram.* p. 260.

Culm about two feet high, erect, scabrous on the angles above. *Leaves* longer than the culm, bright green, 3—4 lines broad, smooth. *Sterile spikes* usually 3, alternate, slender, sometimes androgynous, supported on a common peduncle several inches above the fertile spikes; *glumes* oblong-lanceolate, acute, pale brown. *Fertile spikes* 2—3, erect, two or three inches in length, densely fruited, on short exserted peduncles; *glumes* ovate, cuspidate, shorter than the fruit, pale brown. *Fruit* ovate-oblong, gradually acuminate, inflated, bicuspidate.

HAB. In overflowed meadows; Pennsylvania to New-York; not common. Flowers in the end of May.

OBS. This handsome species is common in Europe. Spikes yellowish when mature.

106. *CAREX ampullacea*, Willdenow.

C. spicis sterilibus tribus; fertilibus 2—3, cylindraceis, breve pedunculatis, erectis; fructibus subglobosis, inflatis, rostratis, bifurcatis, gluma lanceolata majoribus; culmo obtuse triquetro.

C. ampullacea, Willd. *sp. pl.* iv. p. 308. *Schk. car.* t. Tt. f. 107. *Dewey car.* l. c. vii. p. 266. *Richard. app. Frank. nar.* ed. 2. p. 36.

HAB. Williamstown, Massachusetts. *Prof. Dewey*. In the woody region of Arctic America. *Dr. Richardson*.

OBS. The species which we consider as the *C. vesicaria*, is perhaps what is called *C. ampullacea* by Professor Dewey. We have specimens of a *Carex* which differs in some respects from *C. vesicaria*, but it hardly appears to be a distinct species.

107. *CAREX retrorsa*, *. Tab. 28. fig. 2.

C. spicis sterilibus subternis, inferioribus sæpe basi fructiferis; spicis fertilibus subquinis, approximatis (quasi corymbosis,) oblongo-cylindraceis, incluse pedunculatis, infima sæpe remota; fructibus ovatis, inflatis, reflexis, rostratis, gluma lanceolata duplo brevioribus.

C. retrorsa, Schw. an. tab. car. l. c. Dewey l. c. ix. p. 67.

Culm about two feet high, erect, thick, obtusely triangular, leafy. *Leaves* longer than the culm, thick and rough, 3—4 lines broad. *Sterile spikes* generally 3, sometimes 2, terminal one slender; common peduncle elongated; *glumes* oblong, rather obtuse, pale brown. *Fertile spikes* 4—6, clustered at the summit of the culm in a somewhat corymbose manner, densely fruited, thick, retrorsely imbricate, especially below the middle of the spikes, the upper ones nearly sessile, lowest one often two or three inches distant from the rest; *bractea* large, and resembling the leaves; *glumes* lanceolate, brown, with a green keel half as long as the fruit. *Fruit* large, ovate, inflated, smooth, nerved; reticulum bifid.

HAB. Borders of Ponds. Waterton, New-York. Dr. Craze. In Massachusetts. Prof. Dewey. Norwich, Vermont; abundant. Dr. Barratt. Flowers in May.

OBS. This species is nearly allied to *C. folliculata*, *ß. polystachya**, but differs in its numerous sterile spikes, reflexed fruit, &c. It also resembles *C. tentaculata* in some respects. The inferior fertile spikes are often compound, bearing one or two short branches at the base.

108. *CAREX Schweinitzii*, Dewey.

C. spicis sterilibus binis, suprema elongata, pedunculata; fertilibus subtribus, oblongo-cylindraceis, subpendulis, remotiusculis, incluse pedunculatis; fructibus oblongo-ova-

tis, acuminato-rostratis, inflatis, bifurcatis, gluma lanceolata attenuata longioribus.

C. Schweinitzii, *Dewey car.* l. c. ix. p. 68.

Culm about a foot high, acutely triquetrous, leafy, scabrous above, rather slender. *Leaves* rather narrow, smooth, carinate. *Sterile spikes* 1—2, the inferior one mostly small, the other long and slender; *glumes* lanceolate, acuminate, pale brown. *Fertile spikes* 3, sometimes 4, somewhat curved, and rather pendulous, not very densely fruited, of a squarrose appearance, an inch and a half in length; upper one sessile, the rest on included peduncles; *glumes* lanceolate, attenuate into a long subulate point, about two thirds the length of the fruit, pale brown. *Fruit* ovate, inflated, spreading, with a long conical rostrum, smooth, nerved, bidentate.

HAB. In wet sandy soil; near Hope, Sussex County, New-Jersey. Williamstown, Massachusetts, and Pownal, Vermont. *Prof. Dewey.* Westfield, Massachusetts. *Mr. E. Davis.* Flowers in June.

OBS. Spikes becoming light straw color. A very distinct species.

109. CAREX bullata, Schkuhr.

C. spicis staminiferis subternis; fructiferis binis, oblongo-cylindraceis, laxiusculis, exserte pedunculatis subnutantibus, distantibus; fructibus ovato-globosis, inflatis, erectis, glabris, costatis, rostrato-acuminatis, ore bifido, gluma lanceolata duplo longioribus.

C. bullata, *Willd. sp. pl.* iv. p. 309. *Schk. car.* t. Uuu. f. 166. *Pursh fl.* i. p. 45. *Dewey car.* ix. p. 71. *Elliott sk.* ii. p. 556.

Culm a foot and a half or two feet high, erect, slender, triquetrous, smooth, leafy. *Leaves* longer than the culm, rather narrow, smooth, slightly scabrous on the margin. *Sterile spikes* 3—4, sometimes but 2, alternate, slender, cylindrical, on an elongated common peduncle; *glumes* ovate-lanceolate, rather obtuse, pale brown, with a green keel. *Fertile spikes* 2—3, oblong-cylindrical, thick, but not densely fruited, two inches or more distant, sometimes very remote, uppermost one (when

Obs. There is a variety of this species with short and almost ovate fertile spikes. The flat leaves and geminate sterile spikes distinguish it from *C. filiformis*.

111. *CAREX lacustris*, Willdenow.

C. spicis sterilibus subquaternis; fertilibus binis vel ternis, erectis, oblongo-cylindraceis, brevi-pedunculatis; fructibus oblongis, multinerviis, subrostratis, glabris, bifurcatis, gluma oblonga-mucronata paulo-longioribus.

C. lacustris, Willd. *sp. pl.* iv. p. 306. *Schk. car.* t. Ooo. f. 152. *Pursh fl.* i. p. 45. *Dewey car.* l. c. x. p. 43.

C. riparia, Muhl. *gram.* p. 259. *Elliott sk.* ii. p. 554.

Culm 3—5 feet high, very thick and strong, sharply triquetrous, leafy, scabrous above. *Leaves* erect, longer than the culm, 4—5 lines broad, carinate, of a thick and coarse texture, somewhat glaucous; sheath white above on the inside. *Sterile spikes* 3—4, the terminal one cylindrical, the others shorter and thicker, of a bright brown color; *glumes* oblong, obtuse or emarginate, mucronate. *Fertile spikes* 2—3, oblong-cylindrical, thick, and densely fruited, somewhat attenuate at the base, sometimes sterile at the apex; upper one nearly sessile; the lower on short peduncles, erect; *glumes* oblong, acuminate or cuspidate, with a scabrous point, brown, rather shorter than the fruit. *Fruit* oblong, with a conical and somewhat rostrate summit; brown, smooth, distinctly nerved; orifice bifurcate.

HAB. In deep swamps, and on the margin of lakes and ponds; Canada to South Carolina; common. Flowers in the beginning of June.

Obs. Muhlenberg, Elliott, and other botanists, consider the *C. lacustris* as a variety of the *C. riparia*, a common European species, and indeed it does not appear to be very distinct.

112. *CAREX cherokeensis* *. Tab. 25. fig. 1.

C. spicis sterilibus 2—4; fertilibus subquaternis, distantibus, ovato-cylindraceis, pedunculatis, apice sæpe staminiferis, subpatulis, fructibus ovatis, subtriquetris, longe-

rostratis, glabris, nervosis bidentatis, gluma ovata valde acuminata brevioribus.

C. cherokeensis, Schw. an. tab. l. c. *C. anonymus*, Herb. Muhl. No. 382.

Culm a foot in height, triquetrous, suberect, slender, somewhat flexuous. *Leaves* shorter than the culm, rather rigid, erect, glaucous, smooth, subcanaliculate; sheaths purple at the base. *Sterile spikes* 2,—4 subcylindric, of a whitish appearance, terminal one much larger than the rest, on a short peduncle; *glumes* oblong, not mucronate, except the lowest. *Fertile spikes* 4—5, rather loose-flowered, all on moderately long filiform peduncles, often almost pendulous; *glumes* ovate, or ovate lanceolate, ending in a long acuminate point, but not mucronate, whitish with a green keel. *Fruit* ovate, with a long rostrum, slightly nerved, bidentate, of a shining white color.

HAB. In the Cherokee country. *Mrs. Gambold.*

OBS. Very fine specimens of this *Carex* we found in the Muhlenbergian Herbarium, but without a name. It is probably the *C. recurva*, of the *Descrip. gram.* p. 262. but certainly not of Schkuhr. Its white spikes and squarrose glumes give it a peculiar appearance.

113. *CAREX longirostris* *.

C. spicis sterilibus ternis, brevibus; fructiferis binis vel ternis, cylindraceis, laxifloris, demum pendulis, longe-pedunculatis, subdistantibus; fructibus ovatis, basi subglobosis, longissime rostratis, glabris bifidis, gluma lanceolata paulo longioribus.

C. longirostris, Torrey in Schw. an. tab. l. c. Dewey car. l. c. ix. p. 257.

Culm about two feet high, slender, triquetrous, scabrous above. *Leaves* shorter than the culm, flat, scabrous on the margin, shining. *Sterile spikes* 2—3, short, erect, the lowest often bearing a few capsules at the base; *glumes* lanceolate, acuminate, hyaline; keel brown. *Fertile spikes* 2—3, on filiform exsert peduncles, cylindric, about an inch and a half long, spreading, and at length pendulous; uppermost one often sterile at the summit; peduncles 2—4 inches long; *glumes* lanceolate or ovate, and cuspidate, white, with a broad green keel, mostly rather

shorter than the fruit, but sometimes a little exceeding it. *Fruit* loosely disposed on the rachis, ovate, with a subglobose base, abruptly produced into a long slender rostrum, slightly bifid at the apex. *Caryopsis* ovate, obtusely triangular, minute, striate and scabrous.

HAB. In wet meadows on river banks. Near Boston. *Dr. Bigelow.* Westfield, Massachusetts. *Mr. E. Davis.* Sheffield, Massachusetts. *Prof. Dewey.* Woods and rocky places, Norwich, Vermont. *Dr. Barratt.*

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(The names printed in italics are synonymes.)

CAREX.	No.	CAREX.	No.
<i>Acuta, L.</i>	99	<i>conoidea, Schk.</i>	80
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<i>alba, Hanke.</i>	75	<i>cristata, *</i>	36
<i>alpestris, Allion.</i>	74	<i>curta, Good.</i>	40
<i>ampullacea, Good.</i>	106	<i>dasycarpa, Muhl.</i>	63
<i>anceps, Muhl.</i>	77	<i>decomposita, Muhl.</i>	23
<i>arida, *</i>	31	<i>Davisii, *</i>	53
<i>aristata, R. Br.</i>	104	<i>Deweyana, *</i>	28
<i>aristata, Dewey.</i>	53	<i>debilis, Mx.</i>	87
<i>atrata, L.</i>	43	<i>digitalis, Muhl.</i>	49
<i>attenuata, R. Br.</i>	8	<i>dioica, L.</i>	1
<i>aurea, Nutt.</i>	58	<i>disperma, Dewey.</i>	16
<i>Barrattii, *</i>	100	<i>Drimeja, L.</i>	86
<i>bicolor, Allion.</i>	27	<i>echinata, β. Wahl.</i>	15
<i>bracteosa, Schw.</i>	21	<i>Elliotii, *</i>	95
<i>bromioides, Schk.</i>	13	<i>festucacea, Schk.</i>	37
<i>bullata, Schk.</i>	109	<i>filifolia, Nutt.</i>	9
<i>Buxbaumii, Wahl.</i>	48	<i>filiformis, L.</i>	103
<i>capillaris, L.</i>	58	<i>flava, L.</i>	66
<i>canescens, L.</i>	40	<i>flexuosa, Schk.</i>	87
<i>cephalophora, Wahl.</i>	12	<i>floridana, *</i>	20
<i>cespitosa, L.</i>	97	<i>foenea, Muhl.</i>	35
<i>cherokeensis, *</i>	112	<i>folliculata, L.</i>	71
<i>Collinsii, Nutt.</i>	73	<i>formosa, Dewey.</i>	52
<i>compressa, R. Br.</i>	54	<i>Fraseri, Sims.</i>	4
<i>concinna, R. Br.</i>	61	<i>fuliginosa,</i>	50
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CAREX	No.	CAREX	No.
<i>granularis</i> , Muhl.	83	<i>remota</i> , L.	42
<i>granularoides</i> , Schw.	81	<i>retroflexa</i> , Muhl.	14
<i>gynandra</i> ,	98	<i>retrorsa</i> , *	107
<i>gynobasis</i> , Vill.	74	<i>Richardii</i> , Mx.	32
<i>hirsuta</i> , Willd.	47	<i>Richardsonii</i> , R. Br.	60
<i>hystericina</i> , Willd.	92	<i>riparia</i> , Good.	111
<i>intumescens</i> , Rudge.	71	<i>rosea</i> , Schk.	15
<i>lacustris</i> , Willd.	111	<i>rostrata</i> , Schk.	
<i>lagopodioides</i> , Schk.	32	<i>saxatilis</i> , Pursh.	69
<i>Lagopus</i> , Muhl.	4	<i>scabrata</i> , *	79
<i>lanuginosa</i> , Mx.	8	<i>Schweinitzii</i> , Dewey.	102
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<i>laxiflora</i> , Lam.	82	<i>scirpoides</i> , Schk.	59
<i>leptalea</i> , Wahl.	6	<i>scoparia</i> , Schk.	23
<i>lenticularis</i> , Mx.	96	<i>setacea</i> , Dewey.	22
<i>leonura</i> , Wahl.	98	<i>sparganioides</i> , Muhl.	19
<i>leporina</i> , Mx.	33	<i>squarrosa</i> , L.	11
<i>limosa</i> , L.	96	<i>stellulata</i> , Good.	38
<i>Linnæana</i> , Host.	1	<i>sterilis</i> , Willd.	2
<i>littoralis</i> , Schw.	100	<i>stipata</i> , Muhl.	12
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<i>marginata</i> , Muhl.	64	<i>sylvatica</i> , Hudson.	86
<i>media</i> , R. Br.	44	<i>tenella</i> , Schk.	29
<i>Michauxii</i> , Schw.	3	<i>tenera</i> , Dewey.	41
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<i>miliacea</i> , Muhl.	90	<i>tetanica</i> , Schk.	81
<i>misandra</i> , R. Br.	51	<i>tribuloides</i> , Wahl.	32
<i>Muhlenbergii</i> , Schk.	17	<i>trichocarpa</i> , Muhl.	101
<i>multiflora</i> , Muhl.	21	<i>triceps</i> , Mx.	59
<i>mutica</i> , R. Br.	56	<i>trisperma</i> , Dewey.	30
<i>Muskingumensis</i> , Schw.	31	<i>typhina</i> , Mx.	11
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<i>Oederi</i> , Ehrh.	67	<i>varia</i> , Muhl.	59
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<i>ovata</i> , Rudge.	26	<i>paniculata</i> , L.	23
<i>paleacea</i> , Wahl.	98	<i>pauciflora</i> , Lightf.	10
<i>pallens</i> , L.	91	<i>pedunculata</i> , Muhl.	25

CAREX.	No.	CAREX.	No.
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NOTE BY THE COMMITTEE OF PUBLICATION.

SINCE the return of Mr. DE SCHWEINITZ to his native country, the Committee of Publication have been favoured with the following note from that gentleman, *which they deem* it proper should accompany the Monograph.

"The Monograph of the Carices, in its present shape, differs so essentially from the unfinished materials, which, on my departure for Europe, I confided to my friend DR. TORREY, with a request to make such use of them as he deemed proper, that it would be an act of injustice to that gentleman to consider him simply in the light of an editor. The judicious and elaborate amendments he has proposed, and the mass of new and valuable matter he has added, entitle him to a participation in the authorship of the work. I am anxious, therefore, that the Monograph should be considered and quoted in all respects, as the joint production of DR. TORREY and myself."

BETHLEHEM, Penn. Dec. 20, 1835



OBSERVATIONS on a fossil Crustaceous Animal of the order BRANCHIOPODA. By J. E. DEKAY. Read Dec. 12. 1825.

THE subject of this notice was presented a few years since, by Professor Noyes of Hamilton College, to the Cabinet of the Lyceum. A label attached to it, purports that it was found in Westmoreland, Oneida County, New-York. It has been described in vol. 3. p. 291. of the American Monthly Magazine. The state of the specimen, at that time, not admitting of close examination, Professor Mitchill was induced to consider it as a fossil fish, and has described it as belonging to the genus *Silurus*. This is not surprising, when we recollect for how long a period the naturalists of Europe mistook the fossil salamanders of Oeningen for fishes of the same genus, not to mention the still greater error of considering them as fossil remains of the antediluvial man.

The following description, with the accompanying plate, will, it is hoped, remove all doubts on the subject, and establish this very singular fossil in its proper place in the system.

ORDER BRANCHIOPODA.

GENUS EURYPTERUS.

Caput a thorace non distinctum. Os ignotum. Oculi duo, sessiles, distantes, lunati. Abdomen elongatum, posticam versus extremitatem sensim gracilius, segmentis transversis subimbricatis divisum. Pedes octo; duo utrinque antici branchiferi, duo utrinque postici maximi, omnes lamellosi.

E. remipes.

DESCRIPTION. *Head* roundish, marked anteriorly by a deep indented line formed by the junction of the superior and inferior plates, similar to the appearance presented on the

anterior part of some Trilobites. *Eyes* distinctly lunated, much depressed, and marked by concentric striae. *Feet* four pair; the two anterior composed of four or more nearly equal articulations, of which the terminal one is the smallest and bluntly pointed, furnished with filaments, which from their size and situation, are supposed to be branchiae. The third pair is rather longer than the two proceeding, and entirely destitute of filaments. The fourth or posterior pair are placed near the junction of the head with the abdomen, and are larger in proportion to the body, than in any living genus of crustacea with which we are acquainted. In the description above alluded to, these natatory feet were mistaken for pectoral fins. As nearly as can be determined from the faint and broken impressions of the upper part of these natatory feet, five articulations are visible, of which the second is furnished on its anterior edge, with two slight spines, and the last terminates in an oval plate, as in the genus *Portunus*. The abdomen consists of eleven distinct articulations tapering gradually to the tail, a small part of which only remains. The abdomen presents no trace of a division into longitudinal lobes.

DIMENSIONS.

Total length	-	-	-	-	-	3.6
Length of the head	-	-	-	-	-	1
Breadth of do.	-	-	-	-	-	1.4
Breadth of the body	-	-	-	-	-	1.5
Distance between the eyes	-	-	-	-	-	.6

Cabinet of the Lyceum.

Plate XXIX.

The remarkable depression of the eyes, with other appearances, lead to the belief that this fossil is merely an impression, and that this impression has been moulded from the upper or dorsal surface of the animal.

From the preceding description and accompanying plate, which is of the natural size, it is evident that this fossil must be referred to the order of branchiopodal crustacea. In the form and structure of the eyes, it resembles the *Isotelus* described in the preceding volume of the Annals, which was referred to the family of Trilobites, and yet the presence of natatory feet, branchial filaments, and more especially the absence of longitudinal lobes, would separate it decidedly from that family. It would be very desirable to ascertain its proper place in the natural series, and to determine whether it might not form a connecting link between the groupe of Trilobites, and some recent genera of the branchiopodal crustacea. A cursory inspection of its external form would lead us at first to place it among the decapodal order of the family Macrouri. The character of that family however will not permit this and a minute examination of the order Branchiopoda. Lat. Entomostraca of others has also failed to satisfy us in this respect. We may be permitted to indicate *Apus*, *Binoculus*, and *Lepidurus*, as the genera to which the present relic seems nearest allied.

We can offer little of interest respecting its geological situation, as it is not known whether it was found in place, or in a detached mass. From the weathered appearance presented by one of its surfaces, we should be inclined to adopt the latter opinion. The rock containing the impression is, as far as we are acquainted, peculiar to this country. It is termed by the country people, bastard limestone, and has had the usual fortune of most of our rocks, to have been described under many different names. It is said to be clay slate by Dr. Mitchill; grey wacke slate, calciferous sand rock, transition sand rock. &c by others. It is of a bluish color, with a conchoidal fracture, homogenous appearance and earthy smell. It effervesces slightly with acids, contains a few siliceous particles, and gives fire with steel.

EXAMINATION of IRON ORES from the Northern Part of the State of New-York. By ISSACHAR COZZENS.

Read December 19th, 1825.

THE following examinations of some ores of iron, were undertaken with a view of ascertaining the exact quantities of iron, the presence of any other metallic oxide, and more especially the nature of the gangue in which these ores occur, whether siliceous, magnesian calcareous, or argillaceous. It was desirable to introduce some improvement in the working of these ores, for experience had taught the proprietors, that those which contained the greatest per centage of iron, were not the most profitable to be worked, but on the contrary, as will be seen by the following analysis, many ores which were mixed with a large proportion of earthy matter, were more easily fluxed, and of course were more profitable to the manufacturer.

It appeared, therefore, that in this case the earthy matter, which was granite, acted as a flux, and consequently that granite or sienite, if containing much felspar, may be advantageously used as a flux for very rich ores of iron, where these rocks are not naturally associated with the ores.

The detection of a new mineral, or of new combinations of minerals, does not seem to me to constitute the chief value of an analysis. A more important end is attained, if we can by analysis, throw out any hints which may improve the manufacture of an article so essential to the wants of mankind.

No. 1. Ore of iron from Peru, Clinton County, New-York.

Character. Its powder is nearly black; magnetic; its specific gravity 4,41 in the specimen examined; it gives fire with steel.

Analysis. One hundred grains coarsely powdered, were submitted to pure muriatic acid, which dissolved ninety

grains, and left ten grains of earthy matter like sand. This earthy substance was examined with the microscope, and appeared to be fragments of hornblende, coccolite, with a small portion of the ingredients of granite.

Pure potash in solution was now added in excess to the solution of muriate of iron, to precipitate the iron and retain the alumine if any was present.

The precipitate of oxide of iron was washed, dried, and heated to a low red; it then weighed eighty-nine grains. In adding pure potash to the solution of muriate of iron, there was an oxide of iron with muriate of potash, the oxide of iron precipitating, and the muriate of potash holding in solution alumine if any was present. In order to determine this I added pure water of ammonia; it let fall a precipitate, which was examined in the following manner after washing and drying it: it was then cooled and moistened with a solution of nitrate of cobalt, which gave a slight blue color; the best test of the presence of alumine. The eighty-nine grains of oxide were now dissolved again in muriatic acid; pure water of ammonia was added to neutralize the solution, then benzoate of ammonia to separate the iron, leaving the manganese in the solution of muriate of ammonia. The compound muriate was sublimed, and left the oxide of manganese at the bottom of the subliming vessel in the form of a white powder, which turned black on being exposed to the air. The powder was then collected, washed, dried, and then weighed one and a half grains. Fused with borax and a small quantity of nitrate of potash, it gave a faint rose color.

Hence it will appear that this ore is composed of

Black oxide of iron,	-	-	87	00
Earthy admixture,	-	-	11	00
Manganese, -	-	-	1	50

99 50 loss 50=100

No. 2. Iron ore from West-port, Essex County, New-York.

Character. Its powder is nearly black when powdered without its matrix, but with it, grey; slightly magnetic; specific gravity 3.58.

Its gangue granite.

This ore was treated by the same process as No. 1, and yielded of granitic rock sixty, black oxide of iron forty, and a trace of manganese, or 24.88 of pure iron in the hundred; this ore is said to work very readily, probably owing to the large quantity of felspar in its gangue.

No. 3. Iron ore from Crown Point, Essex County, New-York.

Character. Not magnetic; specific gravity 3.96; powder of a purple brown.

Analysis. (1.) A piece of this ore was coarsely powdered; in order to examine the earthy residuum with the microscope, after it had been submitted to muriatic acid.

(2.) One hundred grains of the powder was boiled in muriatic acid for half an hour, the solution decanted and more acid added until it ceased to act on the mineral; the solutions were then put together, and the residuum washed; the washings added to the solution, the residuum then weighed 17.50 grains. (See 6.)

(3.) To the muriatic acid solutions and washings, pure potassa was added in excess, to throw down the oxide of iron. The oxide was then dried and ignited with wax. It then weighed about seventy-two grains; when first precipitated it weighed eighty-three, hence it will appear that this ore contains more oxygen than ores No. 1. and 2.

(4.) The muriate of potassa, which was found in adding the potassa to the muriatic solution of iron, was then examined in the following manner: first, some pure water of ammonia was dropt into a portion of it, to precipitate the alumine if any was present; it had no effect on the liquid; next the solution of oxalic acid was thrown into another portion of it, to determine if all the iron had been precipitated, this likewise had no effect.

5. The earthy residuum was now examined ; first, with the microscope, but little of its character could be relied on ; it had, however, the appearance of fragments of felspar, and was easily powdered and gritty to the teeth.

(6.) The earth was now reduced to a fine powder, and fused with potassa in a silver cup. The fused mass was suffered to cool, then dissolved in pure distilled water and filtered ; the potassa had nearly dissolved, only leaving a small trace of iron ; then to the alkaline solution was added muriatic acid, it let fall a precipitate of silex, which weighed 15.75 grains, having lost 75, which appeared to be alumine.

(7.) The precipitate of oxide of iron (3) was then dissolved in muriatic acid, and neutralized with pure water of ammonia, then precipitated with benzoate of ammonia, forming a benzoate of iron, and a compound solution of muriate of manganese and ammonia, if any manganese was present. The benzoate of iron was then separated from the solution by the filter. The clear solution that was supposed to contain the manganese, was then boiled to dryness, and the muriate of ammonia sublimed, leaving the manganese, which when dried weighed 2.4 grains ; it was then fused with borax and nitrate of potash, giving its usual rose colour with a tint of violet.

Hence it will appear this ore contains of

Red oxide of iron	-	-	-	79	60
Manganese, -	-	-	-	2	4
Silex, -	-	-	-	15	75
Alumine, -	-	-	-	1	75
					<hr/>
					99 50
loss					50.

No. 4. Iron ore from Moriah, Essex County, New-York Variety No. 1.

Character. Its powder is blackish, with a shade of purple ; magnetic ; specific gravity 4.92 ; has a greyish mineral imbedded in it in grains, the size of fine sand.

(1.) One hundred grains lost in calcining one grain in weight.

Analysis. (2.) The remaining ninety-nine grains were submitted to muriatic acid in the usual way, which dissolved the oxide of iron, leaving seven grains not acted upon. The seven grains appeared to be sand composed of fragments of granite. Felspar, quartz, and mica, were easily distinguished by the microscope after the oxide of iron had been removed.

(3.) The solution of (2,) containing the muriate of iron, was now precipitated with pure potash and filtered. The oxide of iron caught on the filter, was washed, dried, and then ignited with wax, it then weighed ninety-one grains.

(4.) Ten and a half grains of the oxide were dissolved in muriatic acid, and neutralized with water of ammonia, and precipitated with benzoate of ammonia, and filtered; the filtered solution was then boiled to dryness; the dry mass was then sublimed to get clear of the muriate of ammonia; there remained in the subliming vessel, of manganese.25 of a grain. Now if 10.50 gives 25, 91 will give 2.87.

(5.) The seven grains of earthy admixture was then powdered and fused with pure potassa, which dissolved all but a trace.

Hence this ore is composed of

Black oxide of iron,	-	-	-	89	13
Manganese,	-	-	-	2	87
Silicious admixture,	-	-	-	7	00
				99	00 loss 1.
Or of oxygen,	-	-	-	19	88
Iron,	-	-	-	69	25
Manganese,	-	-	-	2	87
Silicious admixture,	-	-	-	7	00
				99	00 loss 1.

No. 5. Iron ore from Moriah, Essex county, New-York.

Character. Somewhat irised, or pavonine; magnetic.

Sp. gr. 4.50; its powder black. This ore was treated in a similar manner as No. 4 above, and proved to consist of

Black oxide of iron	-	88	50	or	{	Oxygen	-	20	28
					{	Iron	-	68	22
Silex	-	-	-	6	00				
Alumine	-	-	-	3	00			88	50

97 50 loss 2.50

With a trace of sulphur and a trace of manganese.

NOTES ON SHELLS. By D. H. BARNES.

No. II.

[Read December 26, 1825. Continued from page 140.]

THE want of books is a great obstacle to the progress of the student of natural history; for whatever new or curious object he may discover, he cannot be sure that he will be safe in publishing it, unless he has examined all the books in that department. Many of these books in our country are not to be obtained, and some that we have, are imperfect copies, deficient in the important part of plates. Under these circumstances that we make any progress in natural science, is an evidence of zeal and industry; and these circumstances ought to alleviate any censures which might otherwise be justly charged upon us, when we publish as new, those things which our more favored brethren abroad have previously discovered, but of which discovery they have not communicated to us the knowledge. Science is a republic in which every man has a right to think and act for himself. If the decisions of our foreign friends appear to us just and reasonable, we shall

receive them. If they appear unjust and unreasonable, we shall reject them. We have the less hesitation in this course, because our friends abroad often disagree with each other; and then, according to ancient rules, we are "free."

DOLIUM DENTATUM,

described in page 135, Plate IX. fig. 3. of this volume, has been noticed both in France and England. The Baron Ferrusac says, "*the description and figure prove that Mr. Barnes has mistaken the genus DOLIUM for the CASSIDARIA.*" This remark shows that to him the specimen was *new*. Mr. Gray, in the Zoological Journal, p. 511, says, "the DOLIUM DENTATUM is the DOLIUM RINGENS of Swainson." Mr. Swainson's work is not among us. I presume Mr. Gray is right. Mr. Swainson then considers it a *Dolium*, and after careful examination, has so described it. Ferrusac, without having seen it, affirms it a *Cassidaria*. In this passing remark there is a strangeness, not to say carelessness, which is unaccountable. There never was a better characterized *Dolium* than this. It has *all* the characters of that genus. The outer lip is expanded precisely in the manner of *Dolium fasciatum* of Lamarck. The spire channeled in the same manner as *Dolium galea*, *Dolium fasciatum*, and *Dolium perdis*. The base is emarginate, quite as much so as any *Dolium* which we have seen. The slight extension of the inner lip is precisely what is seen in nearly every species of the genus. The *perdis*, *fasciatum*, *maculatum*, and *galea*, have the same. The ribs are exactly similar, and the intermediate elevated line. It more resembles *Dolium galea* than any other; and if a large specimen of each was placed with the back towards the observer, they would not readily be distinguished. Since the former description was published, a specimen has been received which adds full confirmation. The axis is nine inches, and the diameter seven inches; and it so exactly agrees in its

characters with the other, that the description needs very little, if any correction. The epidimis were entire, and the protuberances on the pillar remarkably similar to those of the shell described. It is preserved in Dr. Mitchell's cabinet, and was received from Don Pedro Abadea of Lima. HAB. Quito Island, near Guayaquil.

* NATICA HELICOIDES.*

This shell, of which it appears, by the Zoological Journal, volume I. page 60, that there was only one specimen in England, and another in France, is rather common in our collections. I have reserved a specimen for the authors of the Journal, who say that it must bear my designation rather than theirs.

CYPRÆA MACULATA.*

I had some doubts, as expressed, when I announced this shell; but I have none now. Mr. Gray says it is a variety of the *C. Arabica*, as described by him. In this he is under a mistake. I have fully traced its history. I have all the varieties of *C. Arabica* mentioned by him, and several others; and the *Maculata* is constantly and essentially different from any of them. It never has *brown lines* or *reticulations* on the back, and has always a large dark brown or black spot on the centre of the base. The first which I saw, is that from which the figure was taken; but since that time, numerous specimens have been brought from the Pacific. In its young state, the inside is very pale violet, nearly white, and the outside clouded with zig-zag bands, and light spots resembling the young of *C. Mauritiana*. As it advances in age, the back becomes a dark reddish brown, variegated with well-defined round white spots, resembling Lamarck's *C. Cervina*. The teeth are nearly or quite black, and the basal spot is of the same color. Mr. Gray does not mention a black spot on the

base in any variety of Arabica, nor, so far as I can find, is it ever found in that species. Indeed the two shells are totally unlike, and the *C. Maculata* is as distinct as any other species whatever. It is never reticulated; but in its adult state the back is gibbous, and the shell triangular, like *C. Mauritiana*, or *C. Caput serpentis*. In this state the brown in part covers the white spots, producing a mottled appearance like the *C. Mauritiana*. In very old specimens, the enamel from the base extends more than half-way up the sides, and covers two-thirds of the back. It more resembles *C. Mauritiana* than any other species, but differs from this in having the base and sides somewhat flesh-colored, with numerous black or dark brown spots. It cannot be confounded with any other species by those who have once examined it, and observed it in the various stages of its growth.

The small shells figured on plate ix. were described, but the description withheld, for want of a reference to some of the latter plates of the Encyc. Meth., to which Lamarck makes constant reference, but which, on examination, were not found in any of our copies.

AN ACT
TO INCORPORATE
THE LYCEUM OF NATURAL HISTORY
IN THE CITY OF NEW-YORK.

Passed April 20, 1818.

WHEREAS the members of the Lyceum of Natural History have petitioned for an act of incorporation, and the Legislature impressed with the importance of the study of Natural History, as connected with the wants, the comforts, and the happiness of mankind, and conceiving it their duty to encourage all laudable attempts to promote the progress of science in this State—therefore,

Be it enacted, by the People of the State of New-York, represented in Senate and Assembly, That Samuel L. Mitchill, Caspar W. Eddy, Frederick C. Schaeffer, Nathaniel Paulding, William Cooper, Benjamin P. Kissam, John Torrey, William Cumberland, D. Jurco V. Knevels, James Clements, and James Pierce, and such other persons as now are, and may from time to time become members, shall be, and hereby are constituted a body corporate and politic, by the name of the LYCEUM OF NATURAL HISTORY IN THE CITY OF NEW-YORK, and that by that name they shall have perpetual succession, and shall be persons capable of suing and being sued, pleading and being impleaded, answering and being answered unto, defending and being defended, in all courts and places whatsoever, and may have a common seal, with power to alter the same from time to time, and shall be capable of purchasing, taking, holding, and enjoying to them and their suc-

cessors, any real estate in fee simple or otherwise, and any goods, chattels, and personal estate, and of selling, leasing, or otherwise disposing of the said real or personal estate, or any part thereof, at their will and pleasure: *Provided always*, that the clear annual value or income of such real or personal estate shall not exceed the sum of five thousand dollars: *Provided*, however, that the funds of the said corporation shall be used and appropriated to the promotion of the objects stated in the preamble to this act, and those only.

And be it further enacted, That the said society shall from time to time, for ever hereafter, have power to make, constitute, ordain, and establish such by-laws and regulations as they shall judge proper, for the election of their officers; for prescribing their respective functions, and the mode of discharging the same; for the admission of new members; for the government of the officers and members thereof; for collecting annual contributions from the members towards the funds thereof; for regulating the times and places of meeting of the said society; for suspending or expelling such members as shall neglect or refuse to comply with the by-laws or regulations, and for the managing or directing the affairs and concerns of the said society; *Provided*, such by-laws and regulations be not repugnant to the constitution and laws of this State or of the United States.

And be it further enacted, That the officers of the said society shall consist of a president and two vice-presidents, a corresponding secretary, a recording secretary, a treasurer, and five curators, and such other officers as the society may judge necessary; who shall be annually chosen, and who shall continue in office for one year, or until others be elected in their stead: that if the annual election shall not be held at any of the days for that purpose appointed, it shall be lawful to make such election at any other day, and that five members

of the said society, assembling at the place and time designated for that purpose, by any by-law or regulation of the society, shall constitute a legal meeting thereof.

And be it further enacted, That Samuel L. Mitchill shall be the president ; Caspar W. Eddy the first vice-president ; Frederick C. Schaeffer the second vice-president ; Nathaniel Paulding, corresponding secretary ; William Cooper, recording secretary ; Benjamin P. Kissam, treasurer ; and John Torrey, William Cumberland, D. Jurco V. Knevels, James Clements, and James Pierce, curators ; severally to be the first officers of the said corporation, who shall hold their respective offices until the twenty-third day of February next, and until others shall be chosen in their places.

And be it further enacted, That the present constitution of the said association shall, after passing of this act, continue to be the constitution thereof, and that no alteration shall be made therein, unless by a vote to that effect, of three-fourths of the resident members, and upon the request in writing of one-third of such resident members, and submitted at least one month before any vote shall be taken thereupon.

State of New-York, Secretary's Office.

I CERTIFY the preceding to be a true copy of an original act of the Legislature of this State, on file in this Office.

ARCH'D CAMPBELL,

Albany, April 29th, 1818.

Dep. Sec'y.

CONSTITUTION.

ARTICLE I.


This society shall be styled "The Lyceum of Natural History in the City of New-York."

ARTICLE II.

It shall consist of three classes of members, viz. resident, corresponding, and honorary : resident members, such as dwell in the city of New-York and its immediate vicinity ; corresponding members, such as reside at a distance from said city, or in other states ; and honorary members, such as may be judged worthy, from their attainments in Natural History, to be admitted into the society. The number of honorary members shall never exceed forty.

ARTICLE III.

All members shall be elected by ballot. Candidates for admission shall be proposed in writing, at least two meetings previous to being balloted for. The affirmative votes of three-fourths of the members present shall be necessary to elect a



ARTICLE VI.

The officers of the society shall consist of a president, two vice-presidents, a first and second; a corresponding secretary, a recording secretary, a treasurer, five curators, and a librarian, who shall be chosen annually on the fourth Monday of February. There shall also be elected at every anniversary meeting of the said society, the following committees, viz. a committee of nomination, consisting of five members; a committee of publication, of five members; a finance committee, of three members; and a library committee, of three members: also, an anniversary orator, and a draughtsman to the Lyceum.

ARTICLE VII.

The election of officers shall be by ballot, and the person having the greatest number of votes, shall be declared duly elected.

ARTICLE VIII.

Five members at a stated meeting shall form a quorum, and ten at a special meeting.

ARTICLE IX.

By-laws for the further regulation of the society shall from time to time be made.

ARTICLE X.

No alteration shall be made in this constitution, unless by a vote to that effect, of three-fourths of the resident members, and upon the request in writing of one-third of all the resident members, submitted at least one month previous to any vote being taken thereupon.

CATALOGUE OF BOOKS

IN THE

Library of the Lyceum of Natural History,

DECEMBER 1825.

IN CONTINUATION.

- 291 *Acharius*. Lichenographia Universalis.
- 292 *Ampere*. Description d'un appareil electro-dynamique. Paris, 1824.
- 293 ———. Exposé methodique des phénomènes electro-dynamiques, &c.
- 294 *Audouin, V.* Lettre sur la generation des Insectes. Paris, 1824.
- 295 *Austin*. Summary Description of the Lead Mines in Upper Louisiana. 8vo. Washington, 1804.
- 296 *Barton, W. P. C.* Flora of North America. Illustrated by coloured figures, drawn from nature. 3 vols. 4to. Philad. 1821-3.
- 297 *Berzelius, J. J.* The use of the Blow-pipe in Chemical analysis, and in the analysis of Minerals. Translated from the French of Fresnel, by J. G. Children. London, 1822.
- 298 *Beltrami, J. C.* La decouverte des sources du Mississipi et de la Riviere Sanglante, &c. New-Orleans, 1814.
- 299 ———. (Another copy.)
- 300 ———. Deux mots sur des promenades de Paris a Liverpool. Philadelphia, 1823.
- 301 ———. To the Public of New-York and of the United States; by the author of the Discovery of the Sources of the Mississipi.
- 302 *Beck, T. R.* Elements of Medical Jurisprudence. 2 vols. 8vo. Albany, 1823.
- 303 *Berneaud, T. de.* Relation de la quatrième Fête champêtre célébrée a Meudon, par la Société Linneéne de Paris.
- 304 ———. Rapport au Société Linneéne de Paris.
- 305 ———. Eloge de Palisot de Beauvois.
- 306 *Bigelow, Jacob.* Florula Bostoniensis; a collection of Plants of Boston and its vicinity. 8vo. Ed. 2d. Boston, 1824.
- 307 *Bonaparte, C. L.* American Ornithology, or the Natural History of Birds inhabiting the United States, not given by Wilson. Vol. I. folio. Philadelphia, 1825.

- 308 *Boon-mesch, H. C.* Aanmerkingen omtrent den staat en de even redigheid der bestaandeelen van de Damp Kringslucht, &c. Amsterdam, 1825.
- 309 *Brande, W. T.* Journal of Science and the Arts. 5 vols. 8vo. New-York, 1816-18.
- 310 *Brewster, D.* The Edinburgh Journal of Science. Nos. 1, 2, 3, 4, 5.
- 311 *Brongniart, Ad.* Observations sur les Vegetaux Fossiles renfermés dans les grès de Hoer en Scanie.
- 312 ———. Essai d'une classification naturelle des Champignons. 8vo. Paris, 1825.
- 313 *Bigsby, J. J.* Notes on the Geography and Geology of Lake Huron. (From the Geological Transactions, London.) 4to. 1824.
- 314 *Brackenridge, H. M.* Journal of a Voyage up the River Missouri. Ed. 2d. Baltimore, 1816.
- 315 *Braun Neerguard.* Traite sur la salaison des viandes et du beurre en Irlande.
- 316 *Cordier, L.* Sur les substances Minerales dites en masse qui entrent dans la composition des Roches Volcaniques. 4to. Paris, 1815. (Duplicate.)
- 317 *Chaptal, M. I. A.* Elements of Chemistry. 3 vols. in one. Philadelphia, 1796.
- 318 *Cutbush, J.* The Philosophy of Experimental Chemistry. 2 vols. 8vo. Philadelphia, 1813.
- 319 *Cuvier, G.* Sur les progres des Sciences Naturelles depuis la paix Maritime. 4to. Paris, 1825.
- 321 *Darby, W.* Tour from the City of New-York to Detroit, in the Michigan Territory. New-York, 1816.
- 322 *D'Azara, F.* Essais sur l'Histoire Naturelle des Quadrupeds de la Paraguay, traduits par Moreau St. Mery. 2 vols. Paris, 1801.
- 323 *Defrance, M.* Tableau des corps organisés Fossiles. Paris, 1824.
- 324 *Delomieu.* Voyage aux Iles de Lipari. 8vo. Paris, 1783.
- 325 *Drapiez.* Tableau Analytique des Mineraux. Oblong 4to. Lille.
- 326 *Drummond, J. L.* First Steps to Botany. London, 1823.
- 327 *Du Petit Thouars, A.* Histoire des Vegetaux recueillis sur les Iles de France, Bourbon, et Madagascar.
- 329 *Eaton, A.* Botanical Exercises; including Directions, Rules, and Descriptions, to aid Pupils, &c. 8vo. Albany, 1820.
- 330 *Ehrhart, B.* Dissertatio de Belemnitis Suevicis. 4to. Augustæ Vindelicorum, 1727.
- 331 *Ellis, J.* Natural History of the Corallines. (German.) With 46 plates. 4to. Nuremberg, 1767.
- 332 *Ferrussac, Baron de.* Bulletin des Sciences Naturelles. For 1824-5. 6 vols. 8vo.

- 333 *Field, B.* Geographical Memoir on New South Wales; containing an Account of the Geology, Botany, &c. of New South Wales and Van Diemen's Land. 8vo. London, 1825.
- 334 *Foissac.* Memoire sur la Magnetisme Animal. Paris, 1825.
- 335 *Forster, J. R.* Catalogue of the Animals of North America; containing an Enumeration of the known Quadrupeds, Birds, Reptiles, Fish, &c. &c. 8vo. London, 1771.
- 336 *Fries, E. M.* Novitiæ Floræ Suecicæ.
- 337 *Faujas St. Fond.* Voyage Geologique depuis Mayence jusqu'à Oberstein.
- 338 ———. Classification des produits Volcaniques.
- 340 *Gass, P.* Journal of the Voyages and Travels of a Corps of Discovery under the command of Captains Lewis and Clarke. 8vo. Philadelphia, 1810.
- 341 *Geoffroy, M.* Histoire abrégée des Insectes. 2 vols. 4to. Paris, 1795.
- 342 } *Gerson and* }
 } *Julius.* } Magazin der Ausländischen Literatur, &c. 4 Nos. January to July. Hamburg, 1825.
- 343 *Hare, R.* Remarks respecting Mr. Van Uxem's Memoir on a fused product erroneously identified with the fused carbon of Professor Silliman. Philadelphia, 1825.
- 344 *Haüy.* Traité de Cristallographie. 2 vols. With atlas. Paris, 1822.
- 345 *Hayden, H. H.* Geological Essays, or an Inquiry into some of the Geological Phenomena in various parts of America. 8vo. Baltimore, 1820.
- 346 *Harlan, R.* Fauna Americana, or a Description of the Mammiferous Animals inhabiting North America. Philadelphia.
- 347 ———. Observations on the genus Salamandra. 1824.
- 348 *Hillhouse, A. L.* Essay on the History and Cultivation of the European Olive Tree. Paris, 1820.
- 349 *Hooker, W. J.* Catalogue of Plants contained in the Royal Botanic Garden of Glasgow; with a plan of the Garden. Glasgow, 1825.
- 350 ———. Monograph of the British Jungermannia. No. 10. folio.
- 351 *Howard, W.* Narrative of a Journey to the summit of Mont Blanc, made in July 1819. Baltimore, 1821.
- 352 ———. Report on the practicability of a Canal from Baltimore to the Potomac. Baltimore, 1823.
- 353 *Hoyt, E.* Antiquarian Researches, or Indian Wars. Greenfield, 1824.
- 354 *Hopkirk.* Flora Anomoia, or a general view of the Anomalies in the Vegetable Kingdom. London, 1817.

- Humboldt, A.* Recueil d'Observations de Zoologie et d'Anatomie Comparée. 4to. Paris, 1811.
- Hunter, J. D.* Manners and Customs of several Indian Tribes west of the Mississippi. 8vo. Philadelphia, 1823.
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- . Anatomy of the Ornithorincus Paradoxus.
- . On the Irritability of the Nerves. 1802.
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EXPLANATION OF THE PLATES

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4. *Verrucaria composita*.

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2. *Clupea hudsonia*.

PL. III. Fig. 1. *Androsace carinata*.

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PL. V. Bilobites.

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8. Corolla.

9. Inferior valve of the same.

10. Stamens.

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vellea	3		
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<i>Hirundo fulva</i>	156		
<i>Hister dimidiatipennis</i>	170		
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<i>Hyla delitescens</i>	281		
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lateralis	279		
squirella	279		
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<i>Hypnum Haldanianum</i>	275		
<i>Hystrix dorsata</i>	190		
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<i>Isaria sphingum</i>	129		
<i>Isidium corallinum</i>	19		
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<i>Jungermannia carinata</i>			276
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<i>Lecanora albida</i>			12
angulosa			12
atra			11
brunnea			13
candelaria			13
cæcio-rubella			12
commutata			11
elegans			13
glaucoma			12
irregularis			13
juglandina			13
perella			12
periclea			11
salicina			12
subfusca			12
tartarea			13
varia			12
ventosa			12
Villarsii			12
<i>Lecidea albo-cærulescens</i>			6
atro-alba			5
aurantiaca			7
carneola			6
coccinea			6
citrinella			6
confluens			5
corticola			6
demissa			7
dolosa			6
Ehrhartiana			7
enteroleuca			5
fumosa			5
globifera			7
immersa			6
lapidica			6
luteola			6
marmorea			6
pantosticta			5
premnea			5
sabuletorum			6
sanguinaria			6
versicolor			6
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latebrarum			21
<i>Lycoperdina ferruginea</i>			172
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<i>Mastodon giganteum</i>			143
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<i>Menopoma Alleghaniensis</i>	271	<i>oblongifolia</i>	142
<i>Molorchus affinis</i>	172	<i>strepens</i>	140
<i>Mycetophila rufipes</i>	170	<i>tubiflora</i>	142
<i>Myosotis nana</i>	33		
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<i>Natica patula</i>	136	<i>Saccopharynx</i>	35
<i>Helicoides</i>	385	<i>Siten striata</i>	53
Native silver	247	<i>Sphaeria entomozhiza</i>	123
<i>Nephroma resupinata</i>	17	<i>Spiloma melaleucum</i>	4
		<i>roseum</i>	4
O		<i>Staurotide</i>	19
<i>Obrium dentatum</i>	172	<i>Stereocaulon paschale</i>	19
<i>Opegrapha herpetica</i>	8	<i>Stilbite</i>	60
<i>macularis</i>	8	<i>Sticta anthraxis</i>	16
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<i>centrifuga</i>	14	<i>Trisetum airoides</i>	154
<i>colpodes</i>	15		
<i>conspersa</i>	14	U	
<i>crinita</i>	14	<i>Uniola stricta</i>	155
<i>Peltidea apthosa</i>	16	<i>Ureolaria calcarea</i>	11
<i>canina</i>	16	<i>cinerea</i>	11
<i>Pentstemon alpina</i>	35	<i>Usnea angulata</i>	21
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<i>Porina fallax</i>	10		
<i>leioplaca</i>	10		
<i>lanceolata</i>	10		



Fig. 3.

C



Fig. 4.

Fig. 1.



Fig. 2.





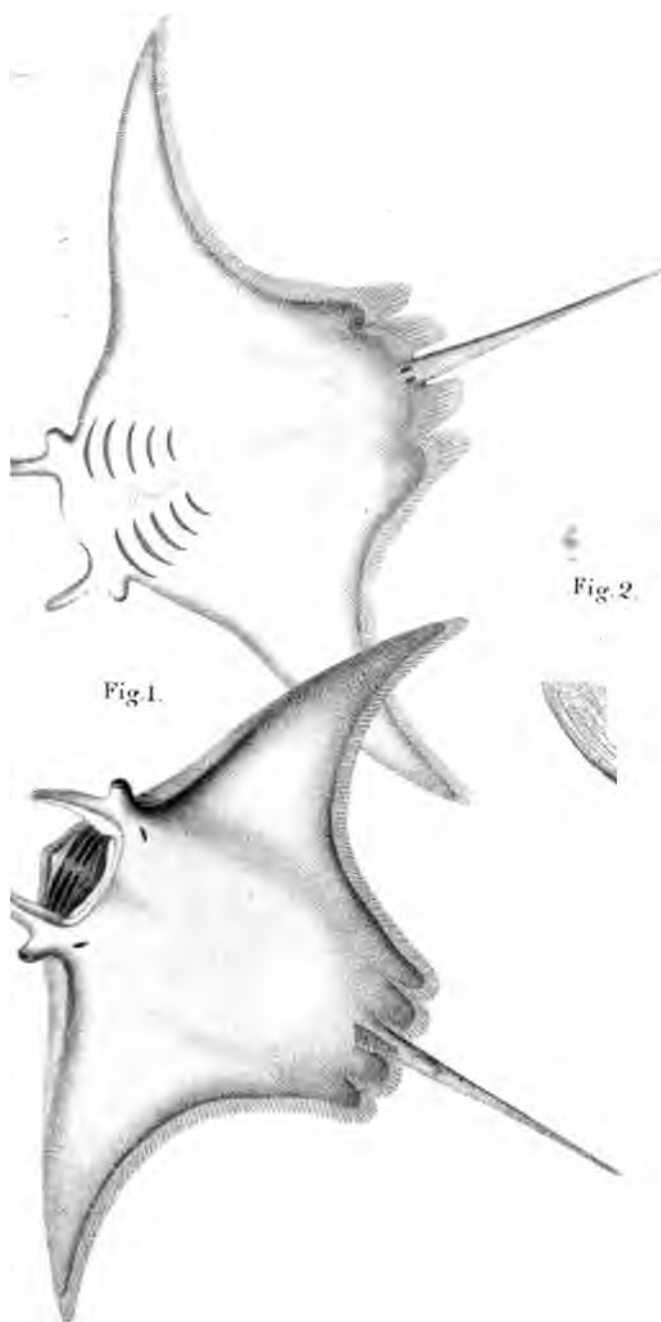






Fig. 2.



Fig. 4.



Fig. 3.



Fig. 1.





Fig. 2.



Fig. 4.

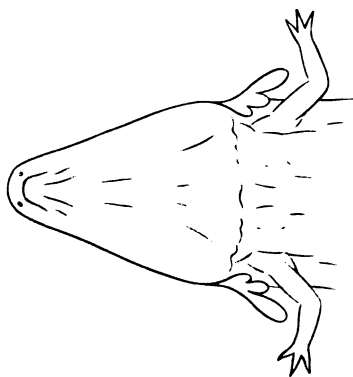


Fig. 3.



Fig. 1.





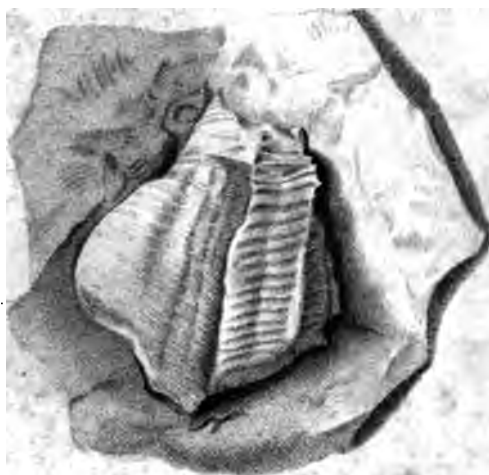


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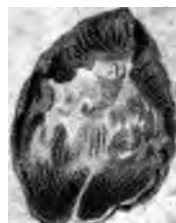


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BILOBITES

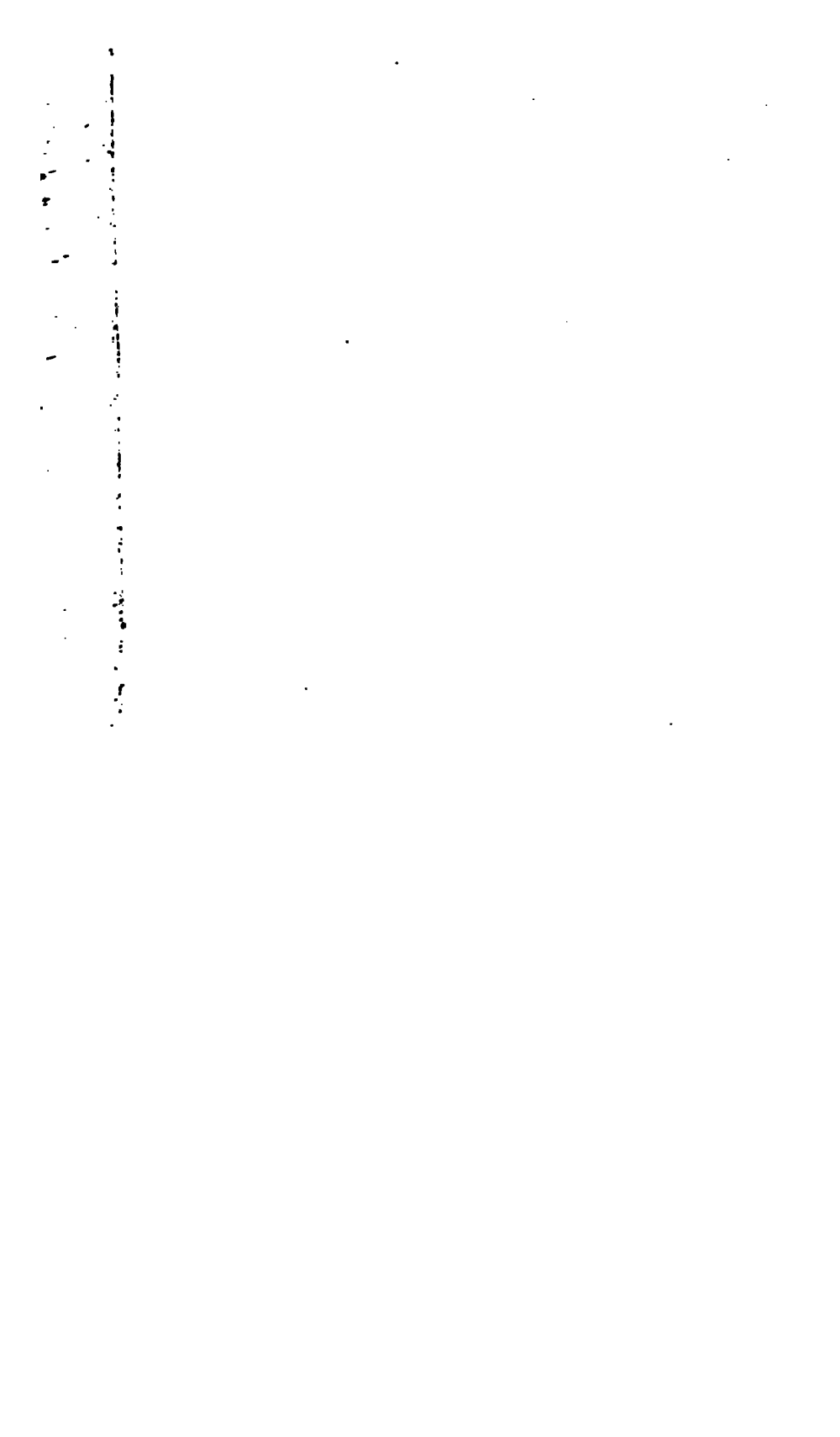
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E. M. sc.

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Plate VII.





A

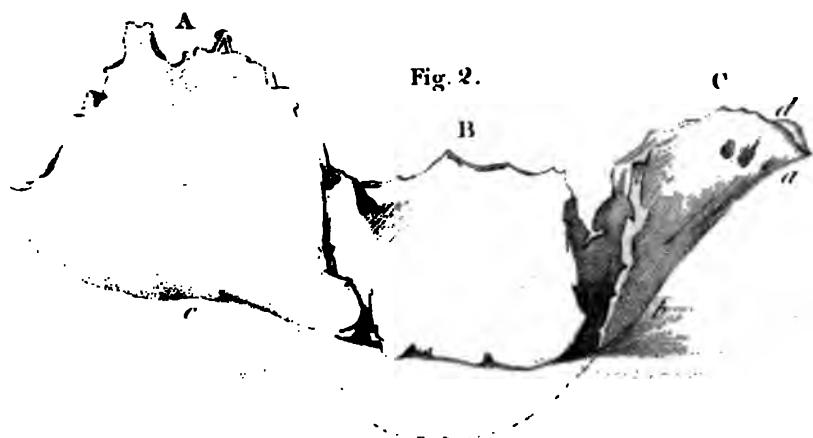
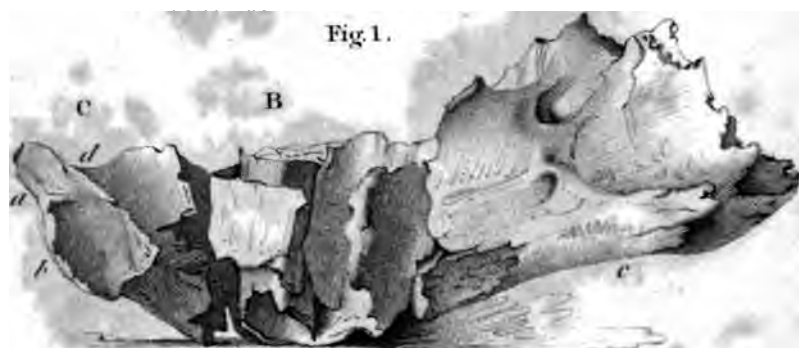


Fig. 3.



Fig. 4.





Pl. IX.

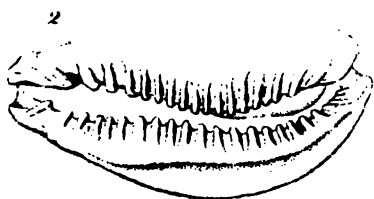
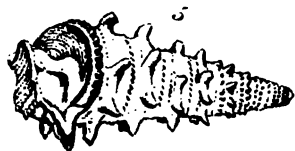
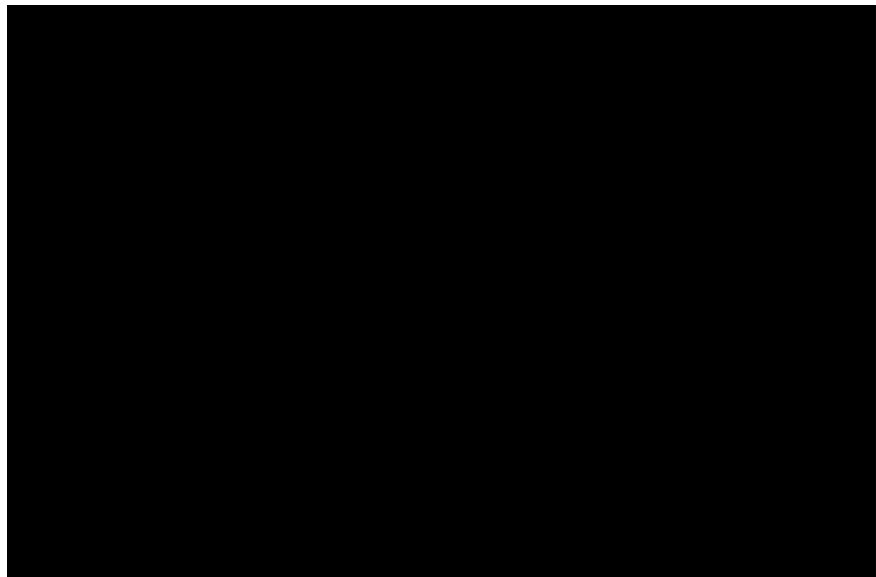
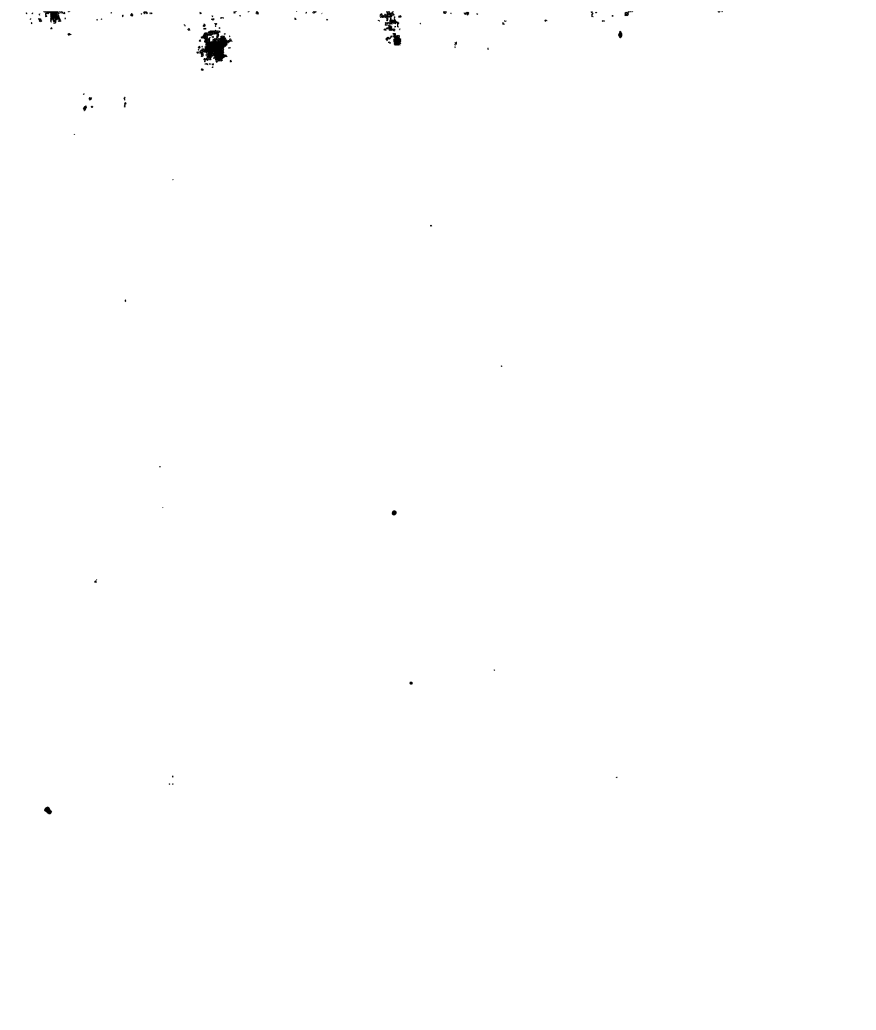


Fig. 1.







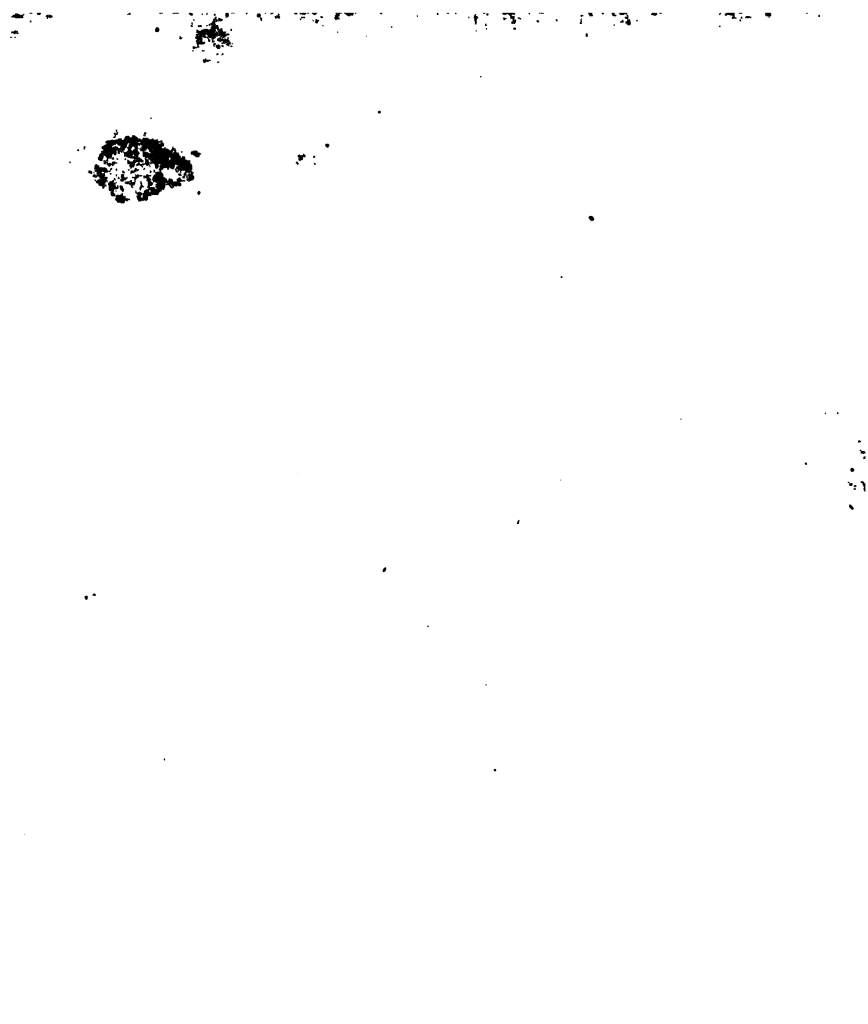


Fig. 1



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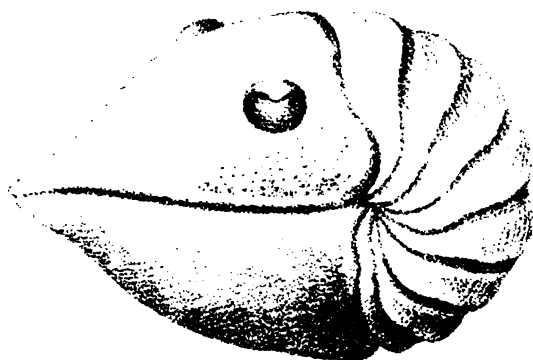




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Fig.1.

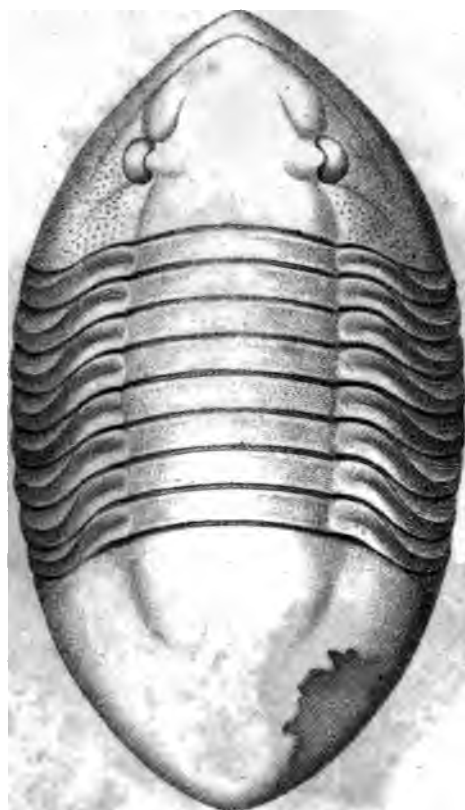


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Fig. 1.



2





Pl. IX.

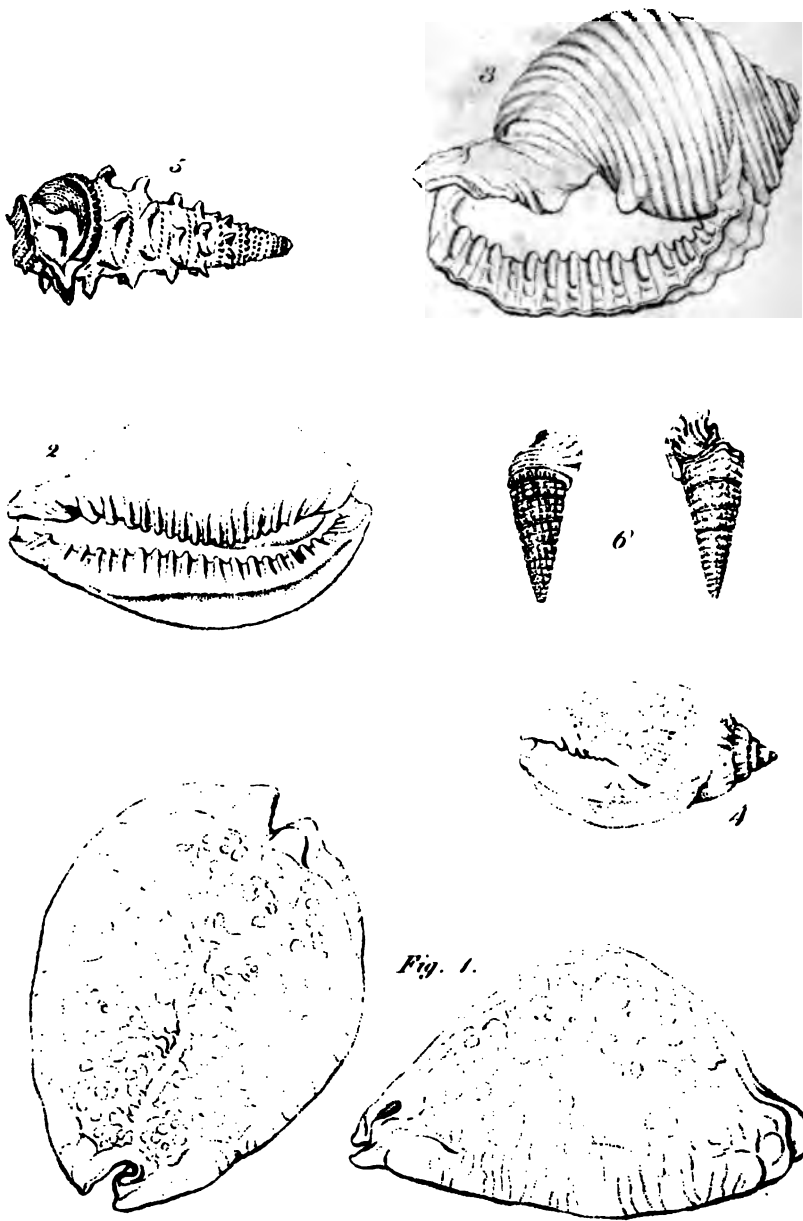


Fig. 1.



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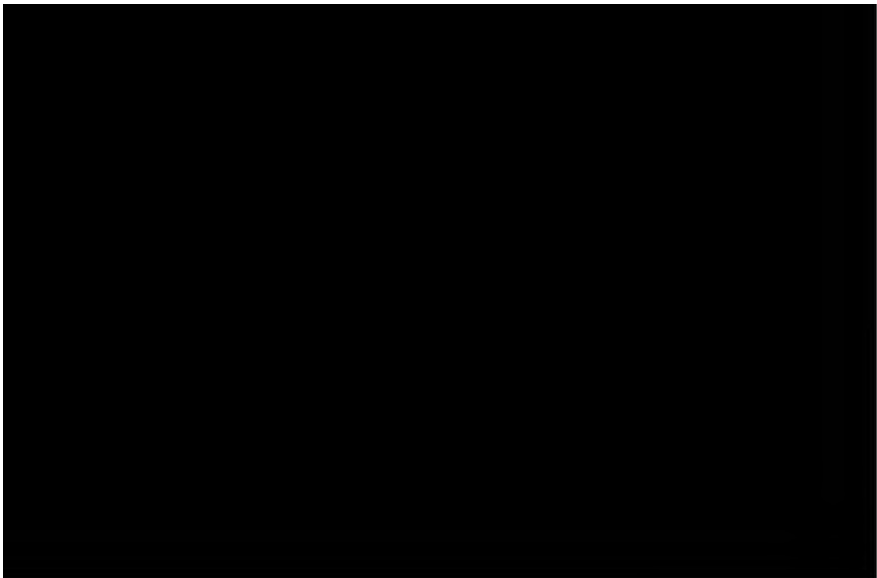
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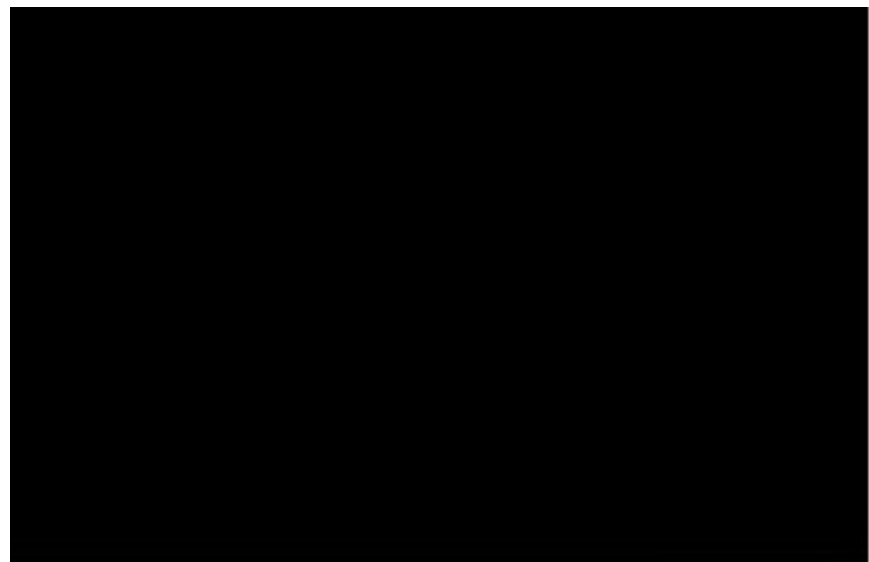
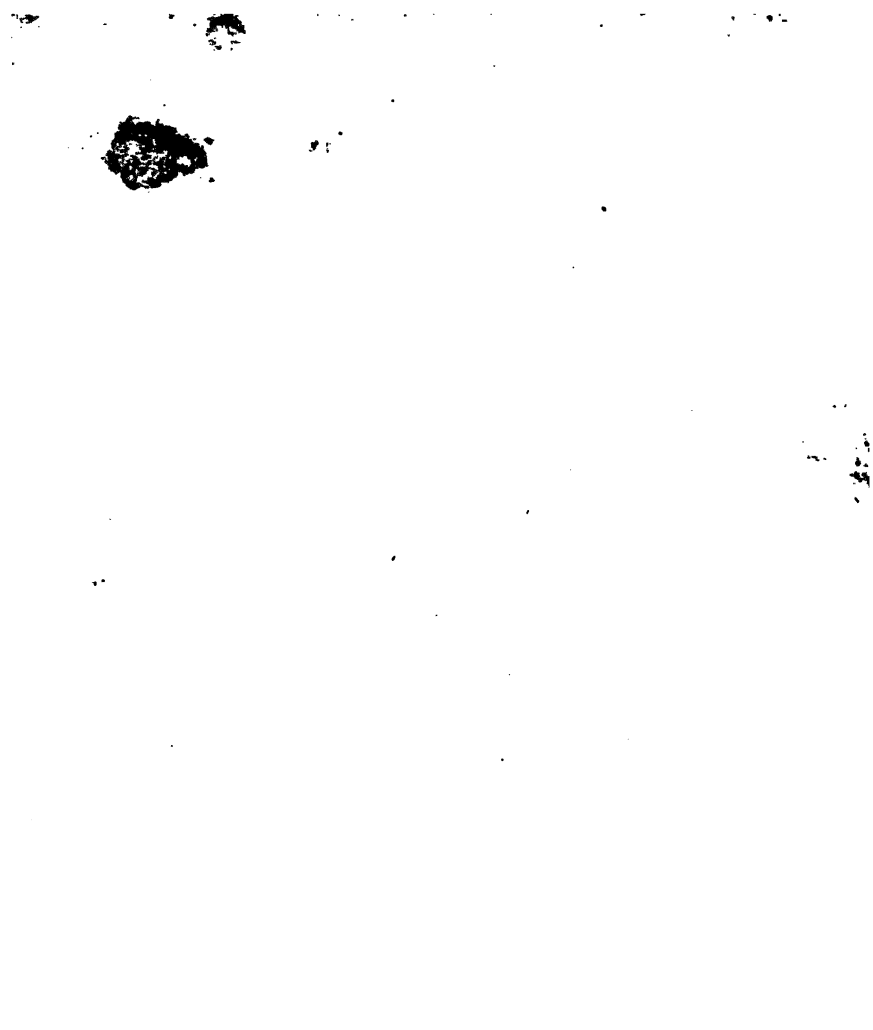


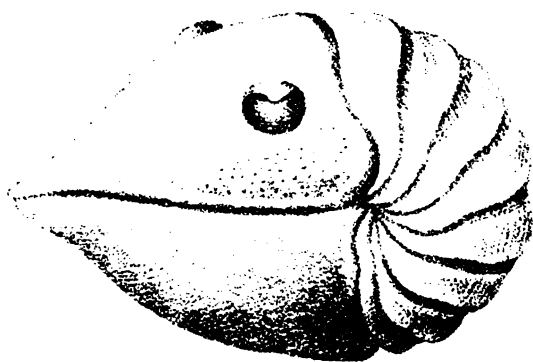
Fig. 1



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Fig. 1.



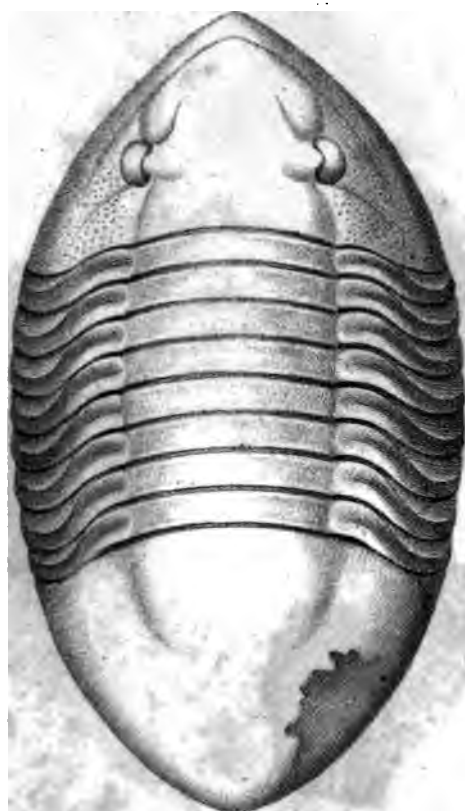
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U. variabilis



Fig. 1.



2





Fig. 1.



2

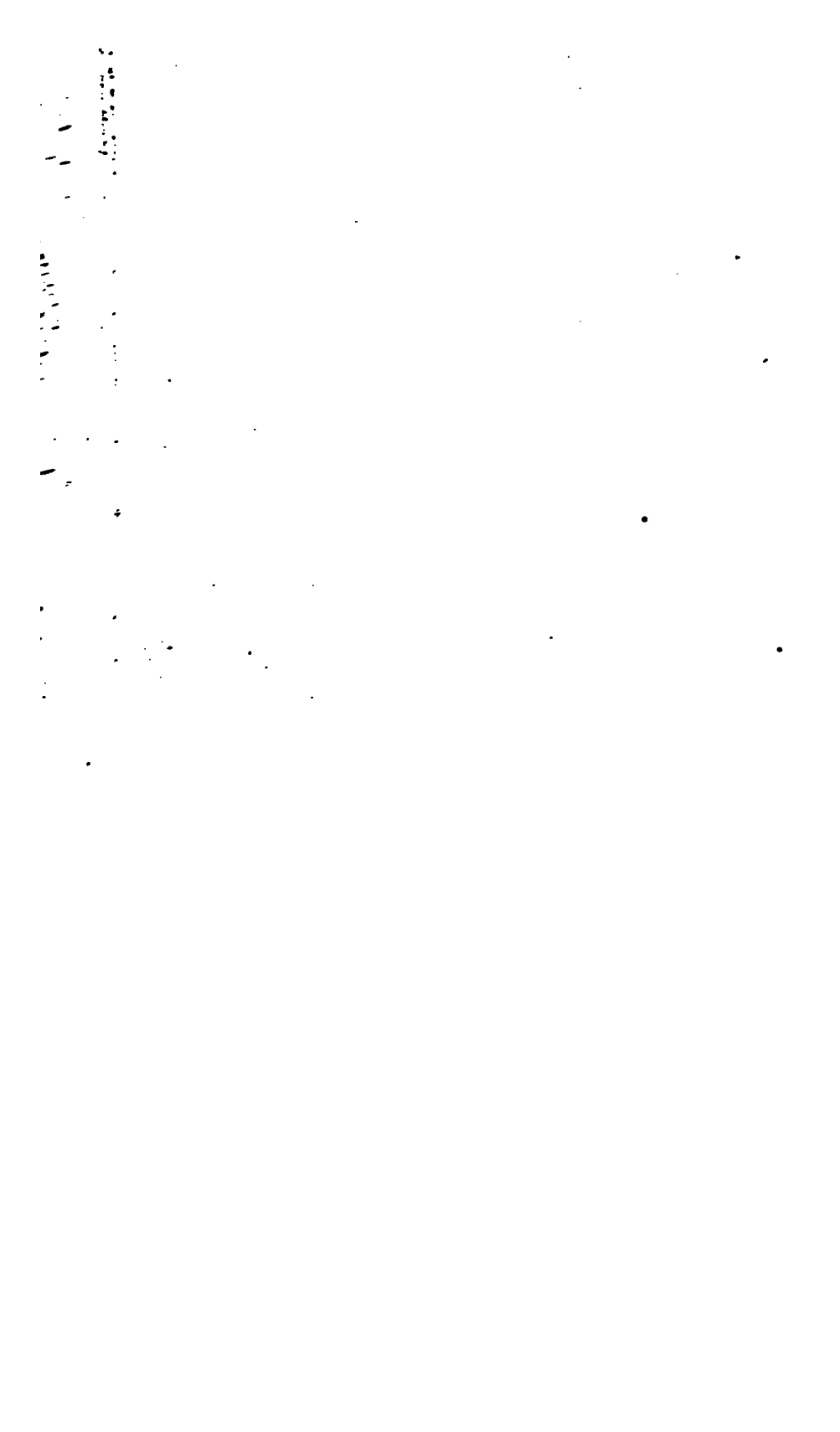


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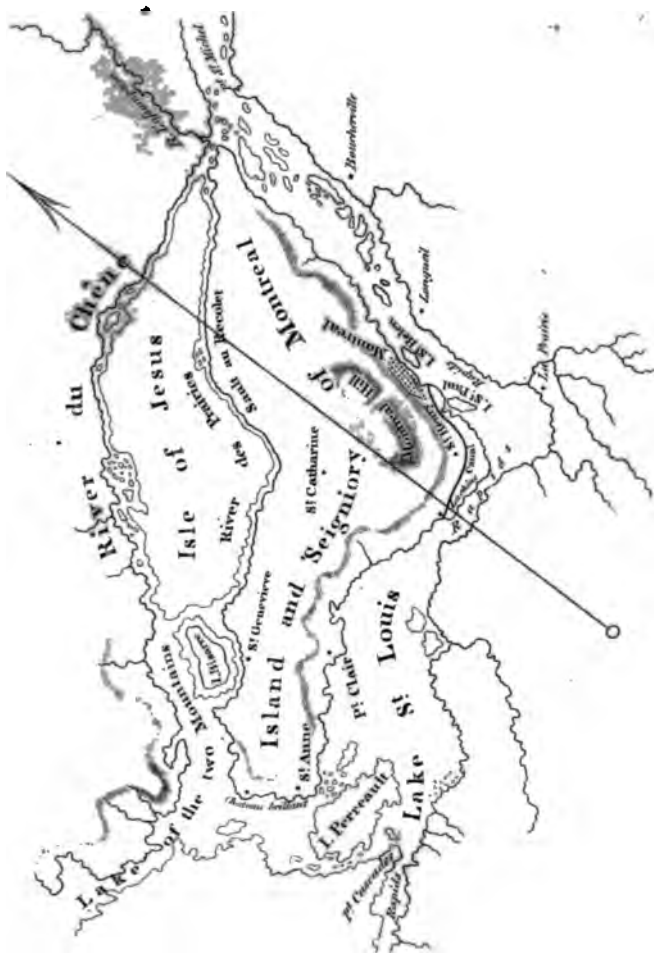
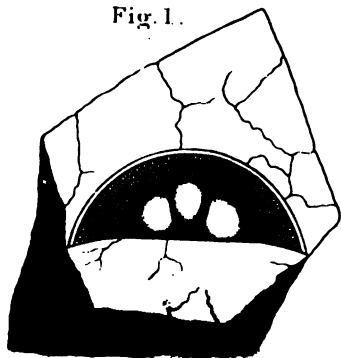


Fig. 1.



the 1990s, the number of people in the UK who are aged 65 and over has increased by 1.5 million (1990-1999) and is projected to increase by a further 1.5 million by 2010 (Office of National Statistics 2000).

There is a growing awareness of the need to develop strategies to meet the needs of the ageing population. The Department of Health (1999) has identified the need to develop a new paradigm of care for the ageing population, one that is based on the concept of 'active ageing' and 'active living'.

The concept of 'active ageing' is defined by the World Health Organization (1999) as 'the process of developing and maintaining the functional abilities that enable people to participate in society'. The concept of 'active living' is defined by the Department of Health (1999) as 'the process of developing and maintaining the functional abilities that enable people to participate in society'.

The concept of 'active ageing' is based on the idea that people should be able to live independently and participate in society. The concept of 'active living' is based on the idea that people should be able to live independently and participate in society.

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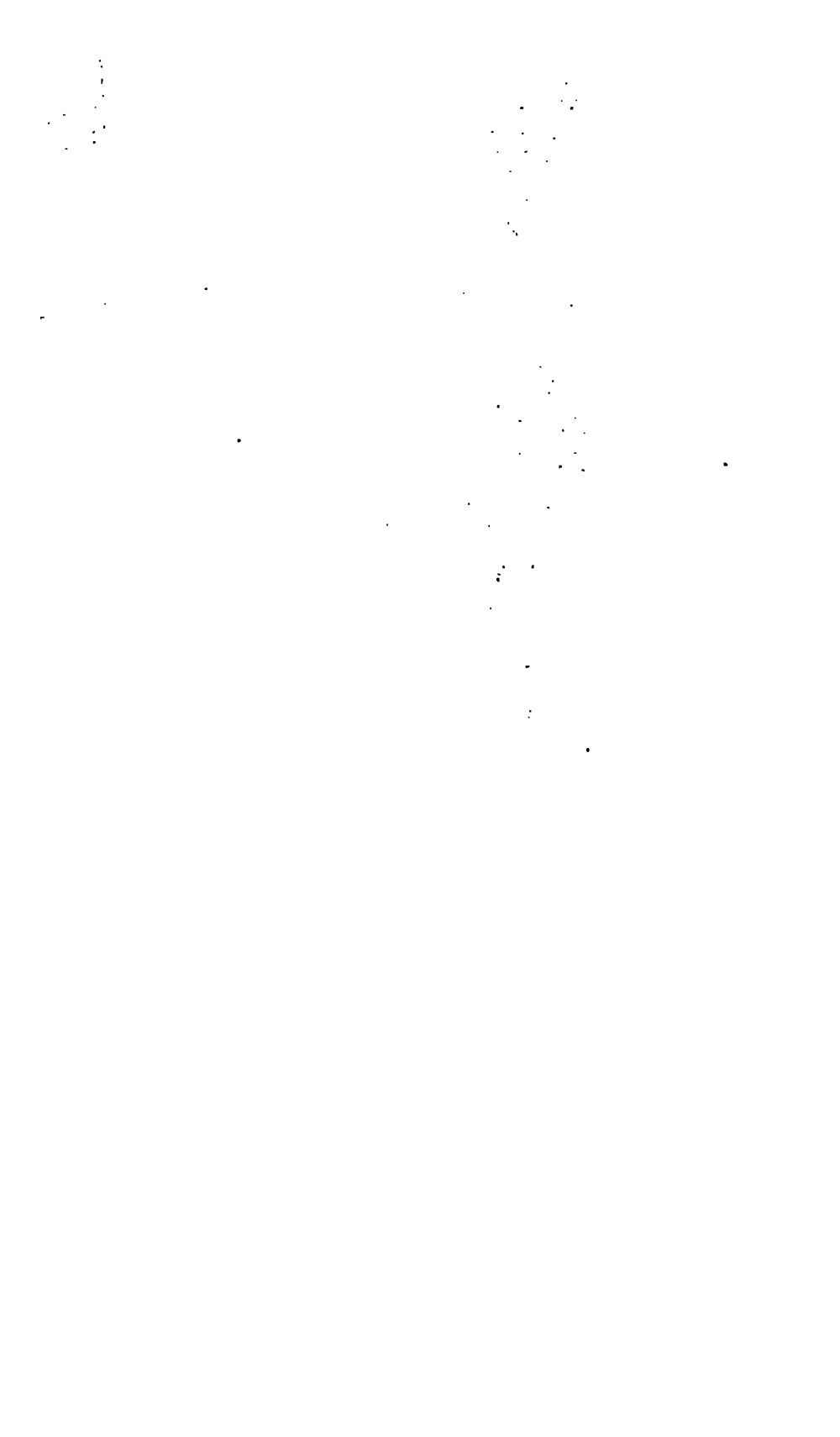
The concept of 'active ageing' is based on the idea that people should be able to live independently and participate in society. The concept of 'active living' is based on the idea that people should be able to live independently and participate in society.

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MEMBRANECTUS LATERALIS.





AMBLYSTOMUS ALLEGHANIENSIS.



218. P. 184. vol. 101. 1861.

John A. Rehnold Jr.

3



2

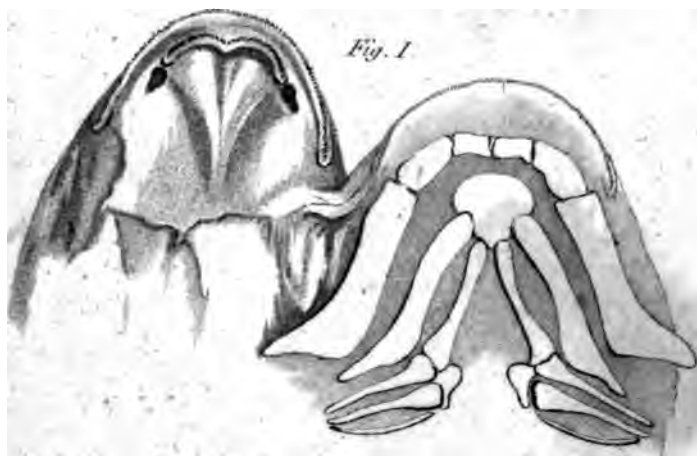


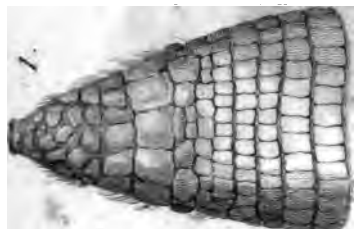
Fig. 1



ALLA STYFFHOLLS KUNSTVERCKEN.







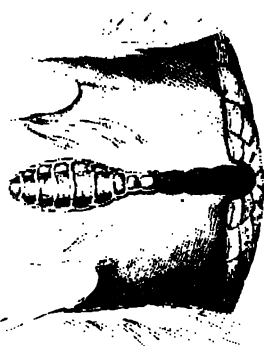
Pinn. Hesperis. n.

Fig. 2.



W. H. Wood del.

3.









AMBLYSTOMUS ALLEGANIENSIS.



Life from the original.

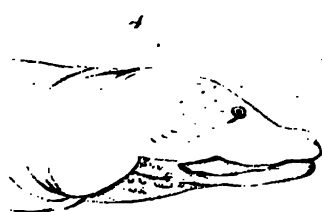
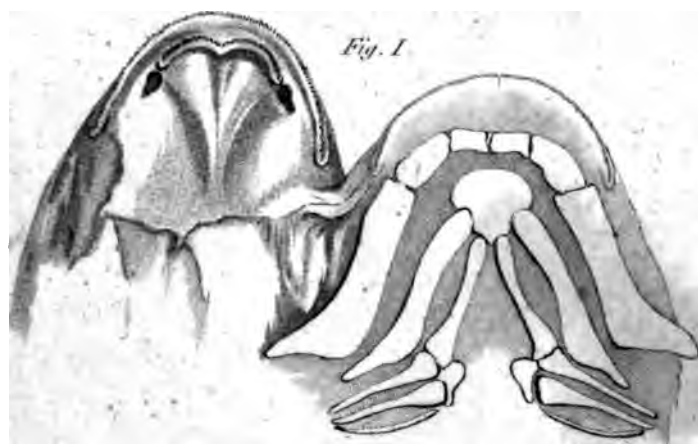
From the original.



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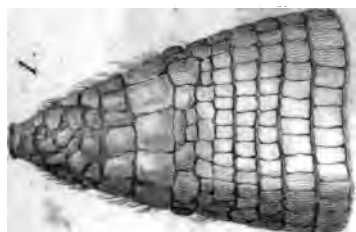
32





CHLAMYDORUS TRIPUCATUS.





Papilio Hesperia, etc.

Fig. 2.

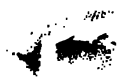
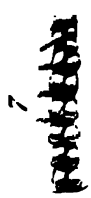


H. H. Wood, del.

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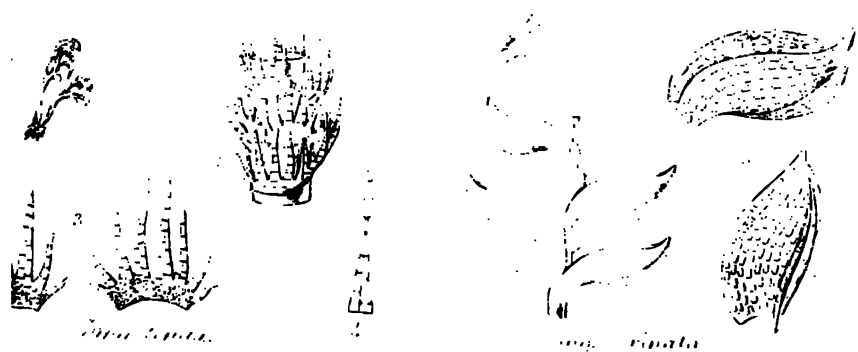
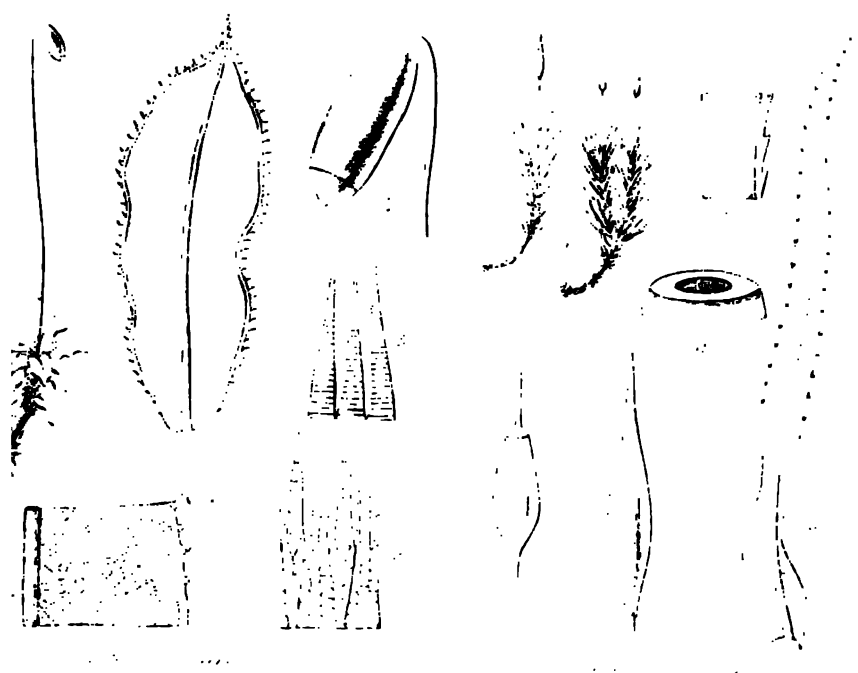






Fig. 1.

Fig. 2.

C. ARIDA.

C. CRISTATA.



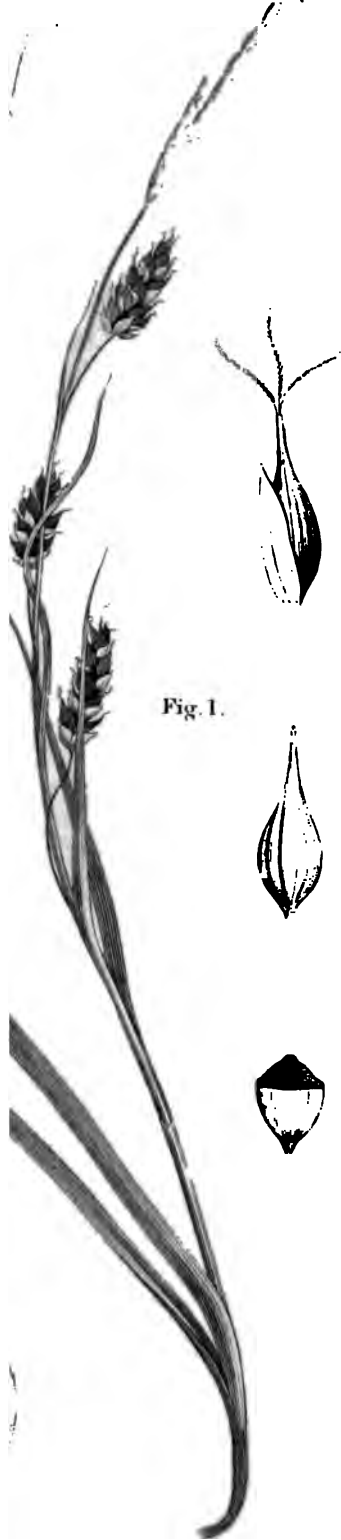


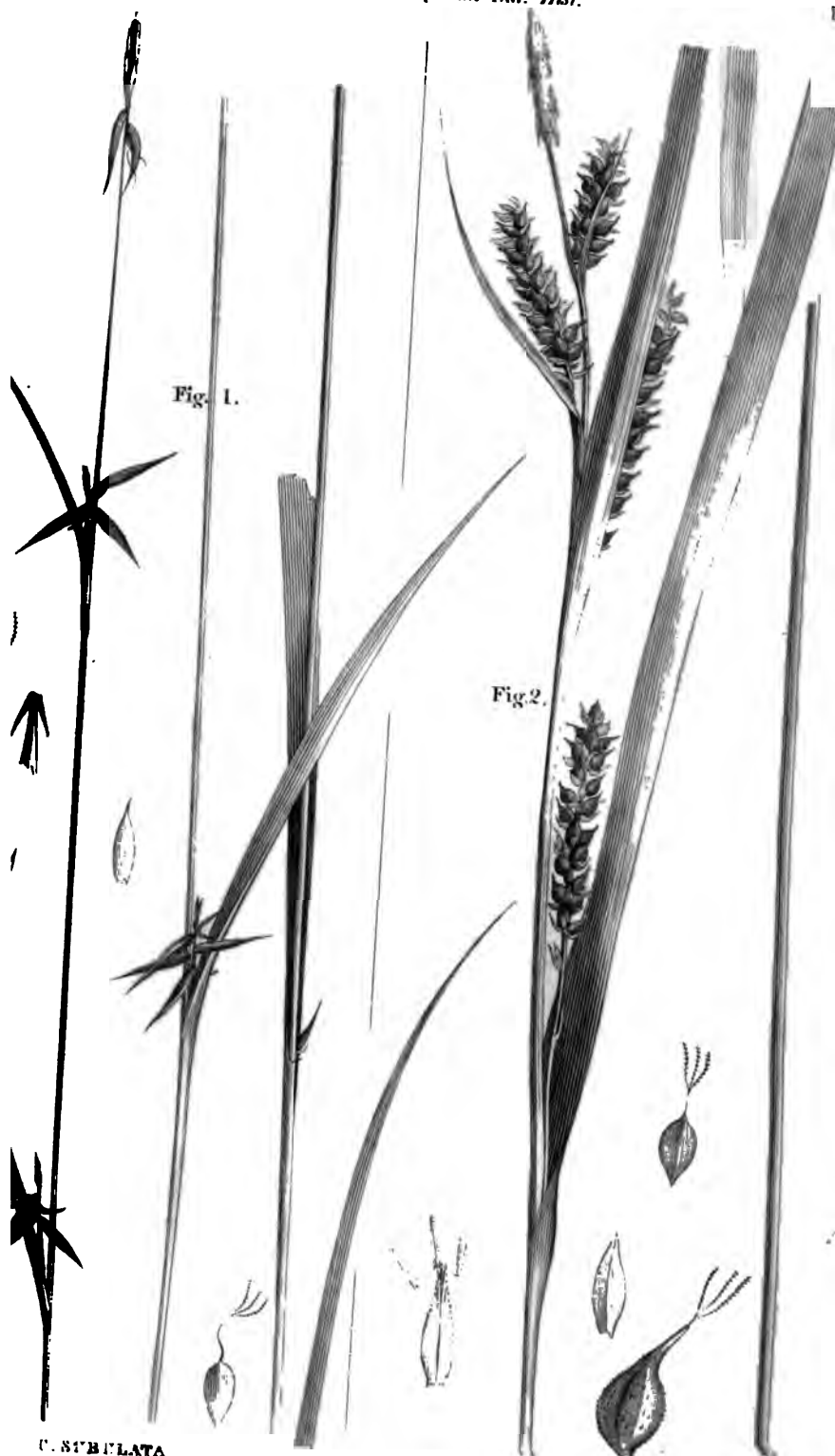
Fig. 1.

C. cherukensis.



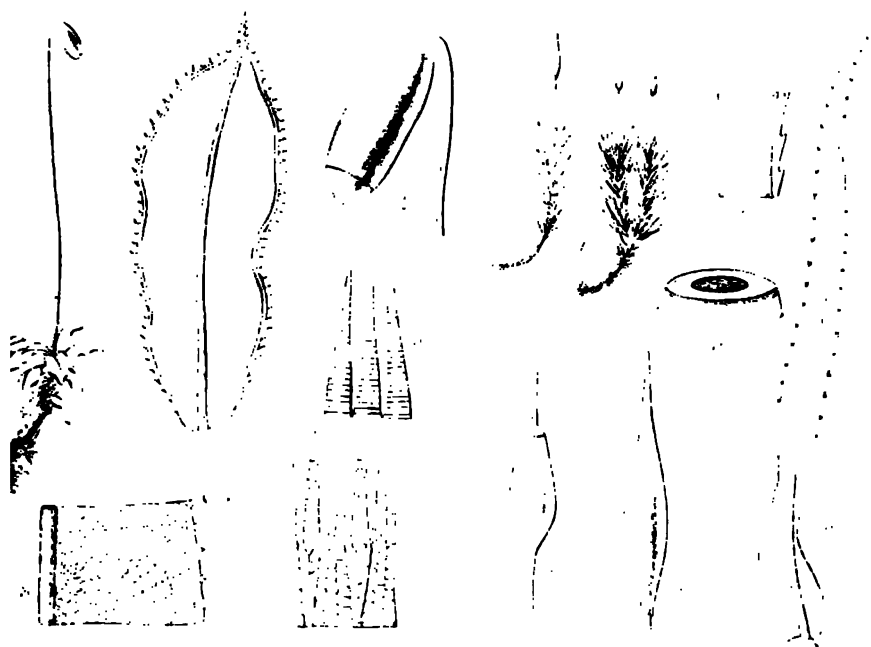
Fig. 2.

C. andrea.



C. SUBULATA

C. SCABRATA



Salvia lyrata

Salvia lyrata

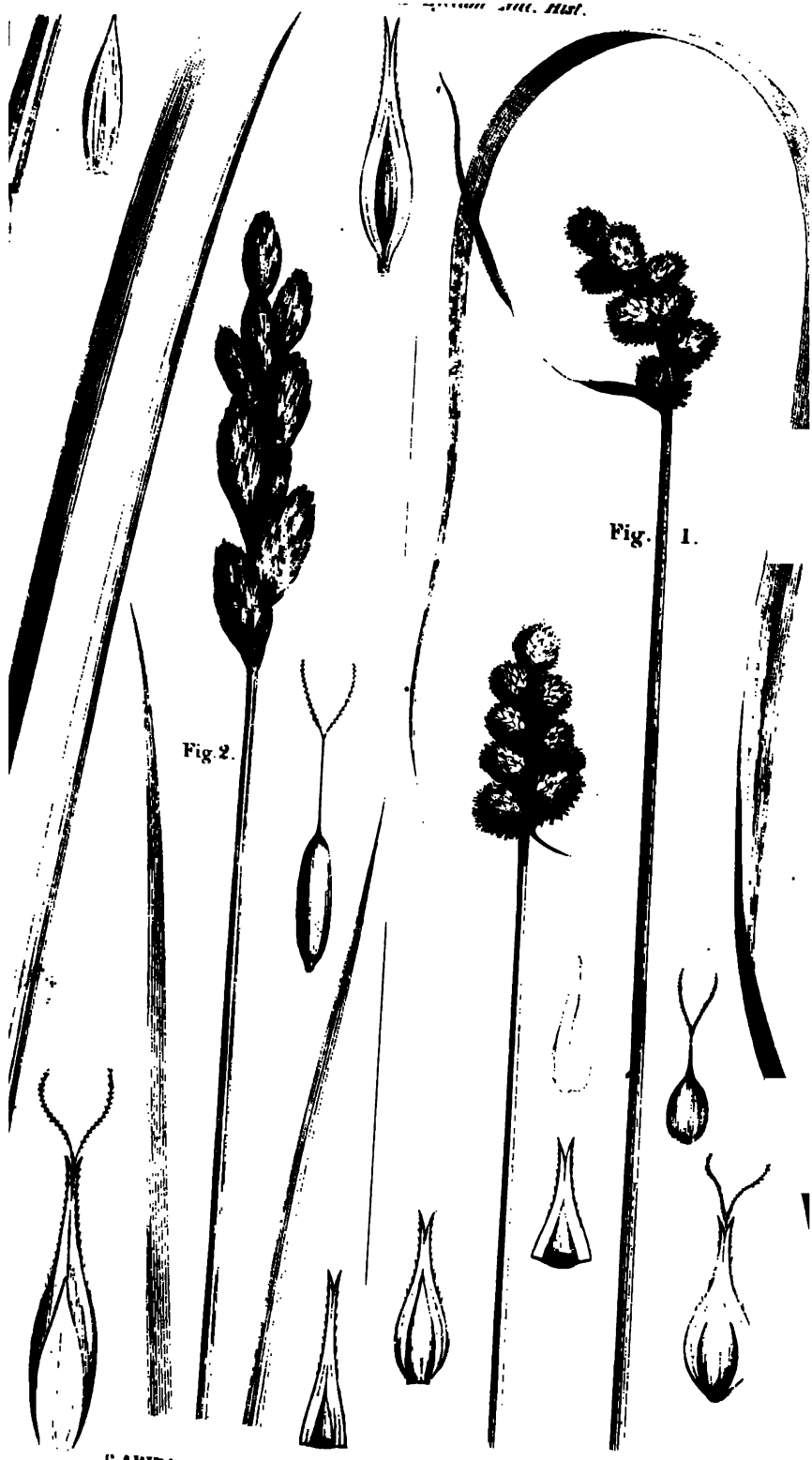


Fig. 1.

Fig. 2.

C. ARIDA.

C. CRISTATA.

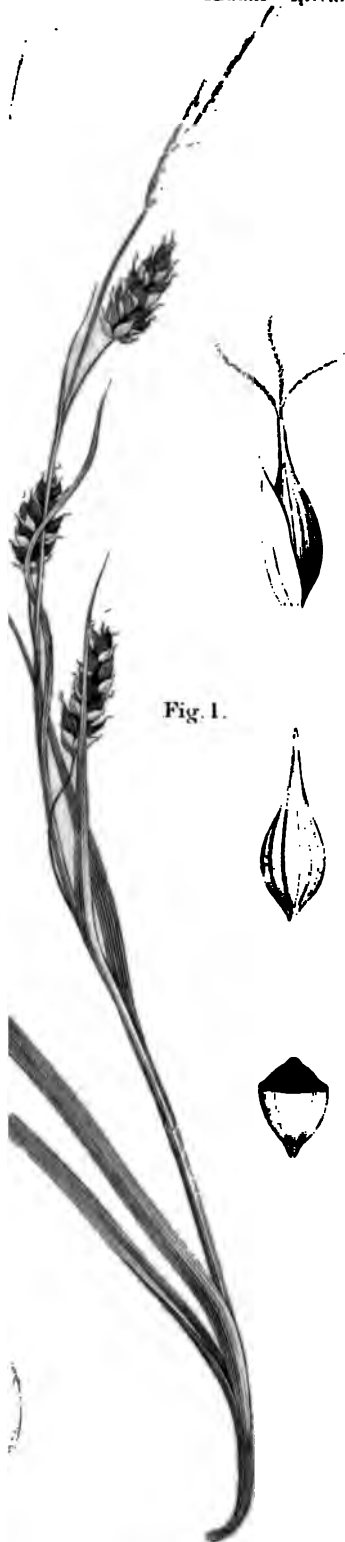


Fig. 1.

C. cherukeensis.



Fig. 2.

C. auria.





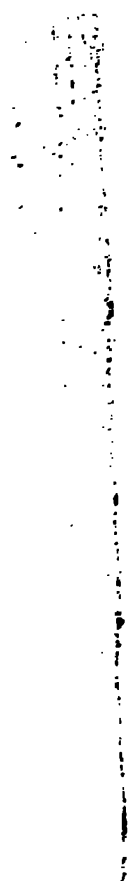
Fig. 1.

Fig. 2.

C. SUBULATA

C. SCABRATA

H. Marshall del.



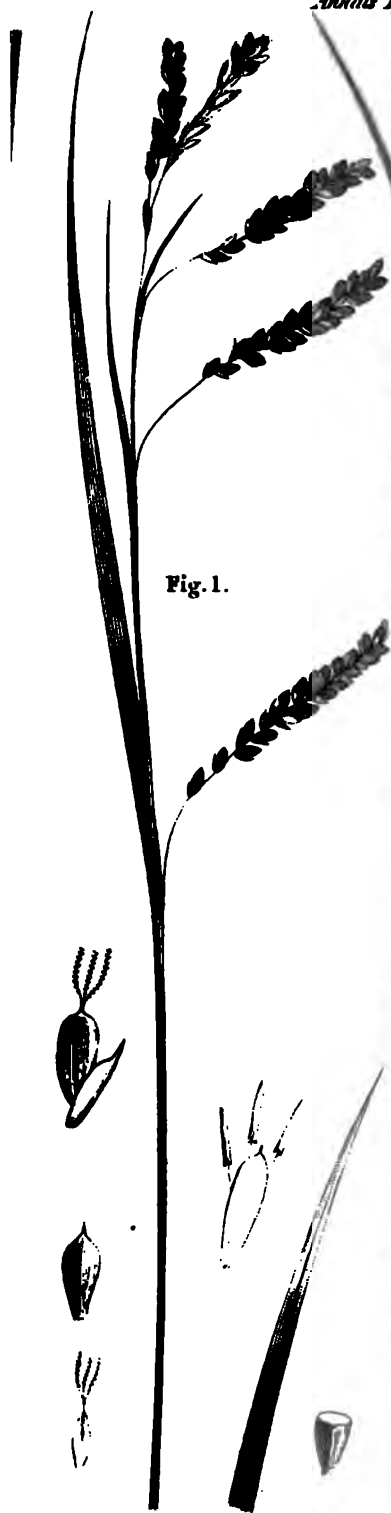


Fig. 1.

C. DIGITALIS.



Fig. 2.

C. DIGITALIS.

A. B. Smith

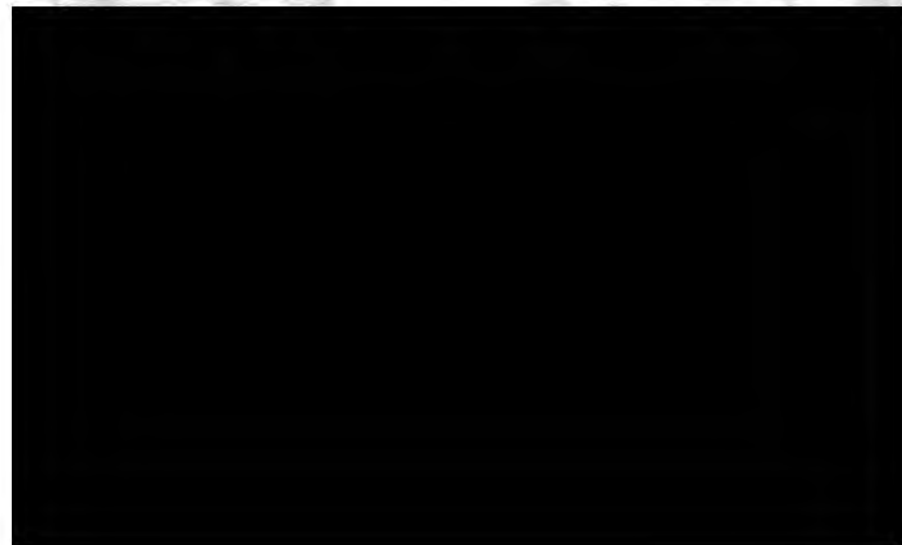






Fig. 2.



L. RETROSA.

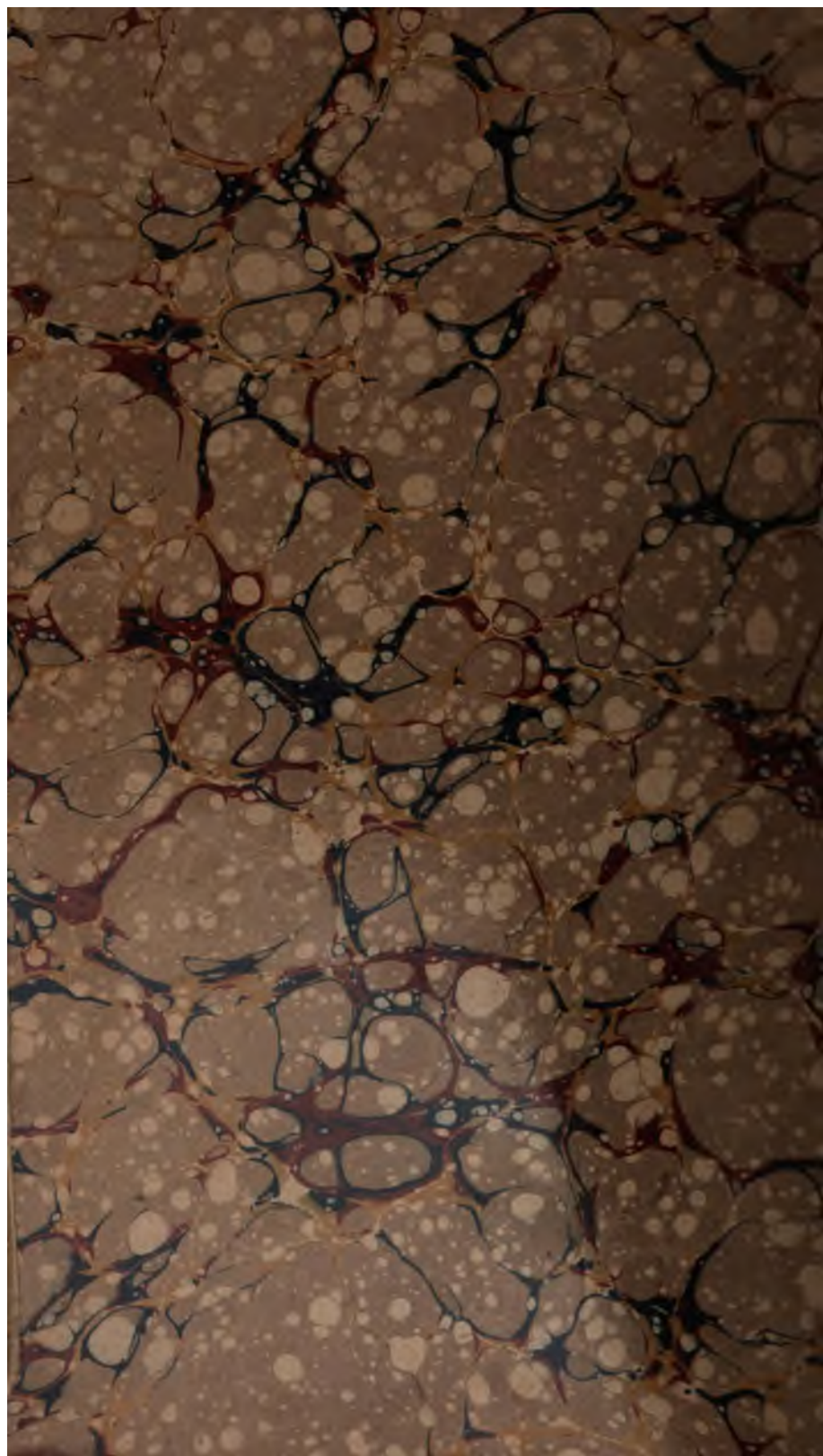
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